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What is Chemistry?

The arrangement of facts discovered by actual experiment and called "science" is conveniently divided into Physics and Chemistry. Physics treat of the changes of matter, without any regard to its internal construction. Thus the laws of gravitation and cohesion belong exclusively to physical science, because they act with total disregard to the composition of a substance. Chemistry, on the other hand, teaches us the composition of the various forms of matter, and the changes they can undergo one with another.

Water, speaking with regard to its physical or natural characteristics, is a colorless, mobile liquid, boiling at 212°, and freezing at 32°, not capable of compression, and many more similar peculiarities. But chemically speaking, water is a compound of so much hydrogen and oxygen, capable of entering into many combinations, and of causing changes in other forms of matter.

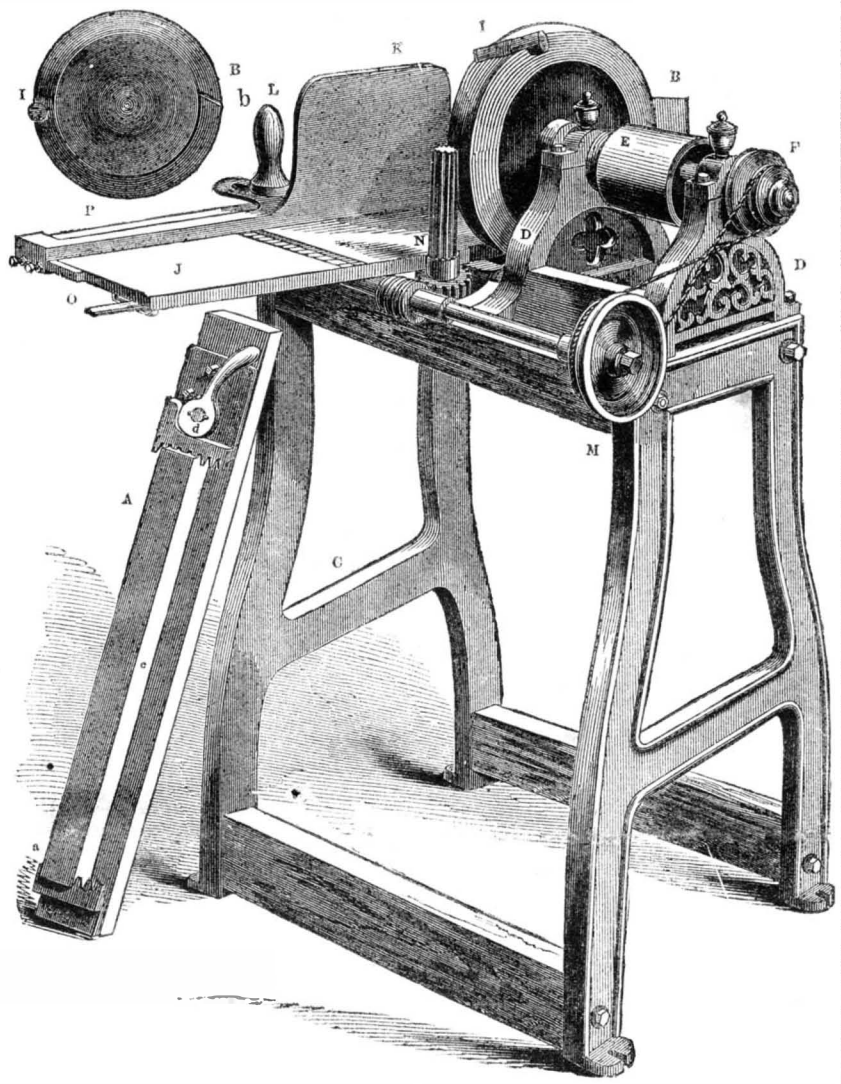
The science of chemistry has undergone a technical division into *organic* and *inorganic*, but in nature there is really no such division—it has only been adopted for convenience of study and expression; for the two classes of substances (organic and inorganic) so lap into each other, that the boundary line is daily becoming more faint, and will in time, perhaps, vanish altogether.

Probably the most safe definition of organic chemistry that can be given in contradistinction to inorganic, is contained in the assertion that the former branch of the science treats of those bodies which are, directly or indirectly, the products of the vital process in animals or vegetables; and this definition is now tacitly admitted by all chemists, although some substances have been produced in the laboratory which are especially peculiar to the process of animal secretion, as for example, uric acid.

Gravitation and Velocity.

M. Boucheporn, of Paris, made an experiment in mechanics, and deduced from it that the force of gravitation varied according to the greater or less speed of the earth in its orbit. A member of the Academy of Sciences has, to all appearance, completely overthrown such a deduction. "If it were true," he says, "the change in the force of gravitation would amount to one 72d part, and it follows that every timepiece regulated by a pendulum, would be advanced or retarded daily at the rate of $72 \times 2 = 144$th part of the number of seconds (86,400) in twenty-four hours, which amounts to ten minutes. Every observatory clock should therefore be disturbed to this extent if such a deduction were true, because the earth is retarded and advanced to this extent in its orbit."

BAKER'S ROTARY PLANER.



These planers dress lumber of all descriptions to any desired thickness, bevel or taper, at the rate of about thirty feet per minute, and also take the "wind" out, leaving the surface smooth, and the corners perfect. They are remarkably simple, and not liable to get out of repair.

In our engraving, A is a dressing slide on which the stuff is placed to be dressed and it can be placed on it so as to cut at any angle; at one end are fixed a row of teeth, *a*, and corresponding ones, *a*, on a sliding frame at the other end; this is slid down to the stuff, *c*; and the handle, *d*, rotated when the cam on its edge causes, *a*, to grip into the stuff and an incline on the axle of *d*, binds the slide tight in its place, thus forming a convenient and simple dressing slide. C is the frame of the cutter having two standards, D, supporting the axle which carries a cutter plate, B, and the belt pulley, E, that gives it motion. A series of regulating pulleys, F, are attached to the extremity of the shaft, which by means of M give motion to the feed roller, N, that is thrown in and out of gear by means of the lever, O. The cutter, B, of which a front view is also given, has one or two cutters placed opposite each other, as I *b*; *b* is represented as an ordinary cutter, but the inventor found that these quickly wore down and became blunt, and it cost some little time to sharpen and adjust these cutters, so he has replaced them with tubular ones, I, which require only to be turned around, when blunt in one spot, and a sharper surface can be immediately presented to the work. K is an adjustable gage which can be moved on the bed-plate, J, to any distance from the cutters by employing the graduated inch scale cut on the bed-plate. P is the gage slide, and L a handle that secures it when properly adjusted. The smaller sizes of this planer can be worked by the foot like an ordinary lathe, and from the specimens of work which we have seen done by this machine, in all kinds of hard and soft wood, it appears to us to be the very thing for small work, and will prove a very useful adjunct to the workshop.

It is the invention of H. H. Baker, Newmarket, N. J., and was patented by him August 18, 1857. He will be happy to furnish any further information on being addressed as above.

Will the Atlantic Telegraph Cable operate?

MESSRS. EDITORS.—I have been waiting for some explanation of the cause of Prof. Morse's resignation of the office of "Electrician to the Atlantic Telegraph Company," but nothing has yet appeared. No reason for this has yet been published, although it seems Prof. Morse discovered that, when the cable was being paid out, before it was broken, the electric current grew feebler and feebler. This fact, although somewhat indefinitely stated, affords some data for inferring that the enterprise will prove a failure.

When experiments were made in England to send the electric current through the cable, they were stated to have been successful, but the conditions of that success did not afford data to predict the favorable working of the cable in the ocean.

The cable experimented with was confined in a comparatively small compass, in a coil, and if a secondary current were excited in any of the conductors, it may have been conveyed so as to assist the primary current. A powerful magnetic action will be evinced in a small circuit, in which the current passes through a fine wire, many miles in length, surrounding an electro magnet; but the same will be very feeble in its effects, if sent through the fine wire of the magnet, extending lengthwise through space, instead of being wrapt in a coil. The same reasoning will apply to the cable tested in a coil at Liverpool, and when laid in the bed of the ocean. In the first case, the current should be strong; in the second, feeble. As the capacity of a conducting wire is according to the solid section, it appears to me that the wires of the cable are too small and with the powerful battery which must be employed, they will be liable to fusion.

I make these suggestions so that proper experiments may be made with the cable before the next expedition starts. Instead of being placed in a continuous coil, the cable should be laid crosswise, like the figure 8, to experiment on the influence of secondary currents; because the cable might get crossed and twisted in the ocean and rendered useless.

S.

New York, March, 1858.

American Lap-Welded Iron Tubes.

We have received a letter from a correspondent, in which he states we were misinformed as to the person who first made the above kind of pipes in America, and the time when, as stated in our recent notice of this manufacture. He informs us that the person who first manufactured these tubes was "John Peace who came to this country from England in 1849, and contracted with Morris, Tasker & Morris, of Philadelphia, to establish them in the business; and that in March, 1850, under his superintendence, the first of these tubes were manufactured."

"In 1851, their manufacture was also successfully carried on at the establishment of Seyfert, McManus & Co., Reading, Pa., under the management of Sampson Dain, who also came to this country from England.

Science in Canada.

A circular has been sent to all the mechanics' institutes in Upper Canada, by the Board of Arts and Manufactures, informing them of its objects and asking their co-operation. This Board has especially for its aim the increase of the knowledge of the mechanic arts, and it now proposes to form a library and museum of inventions, models and patents, which will no doubt form the nucleus of a valuable educational system. Exhibitions are to be held and prizes distributed for inventions of practical utility for the purpose of stimulating the inventive genius of the country. We wish them a hearty success and hope that an honest rivalry may spring up in this branch of industry between them and our northern States, so that both may thereby be benefited, and liberality and good feeling increased.

Ancient Silver Mine.

The Huntsville (Ala.) *Advocate* informs us that an old silver mine has been re-discovered in Hancock county. It was walled up with solid masonry, which had to be removed by blasting before the mine could be re-opened. Large trees are growing over and around it, showing that it cannot have been opened for centuries. The ore is said to be very rich.

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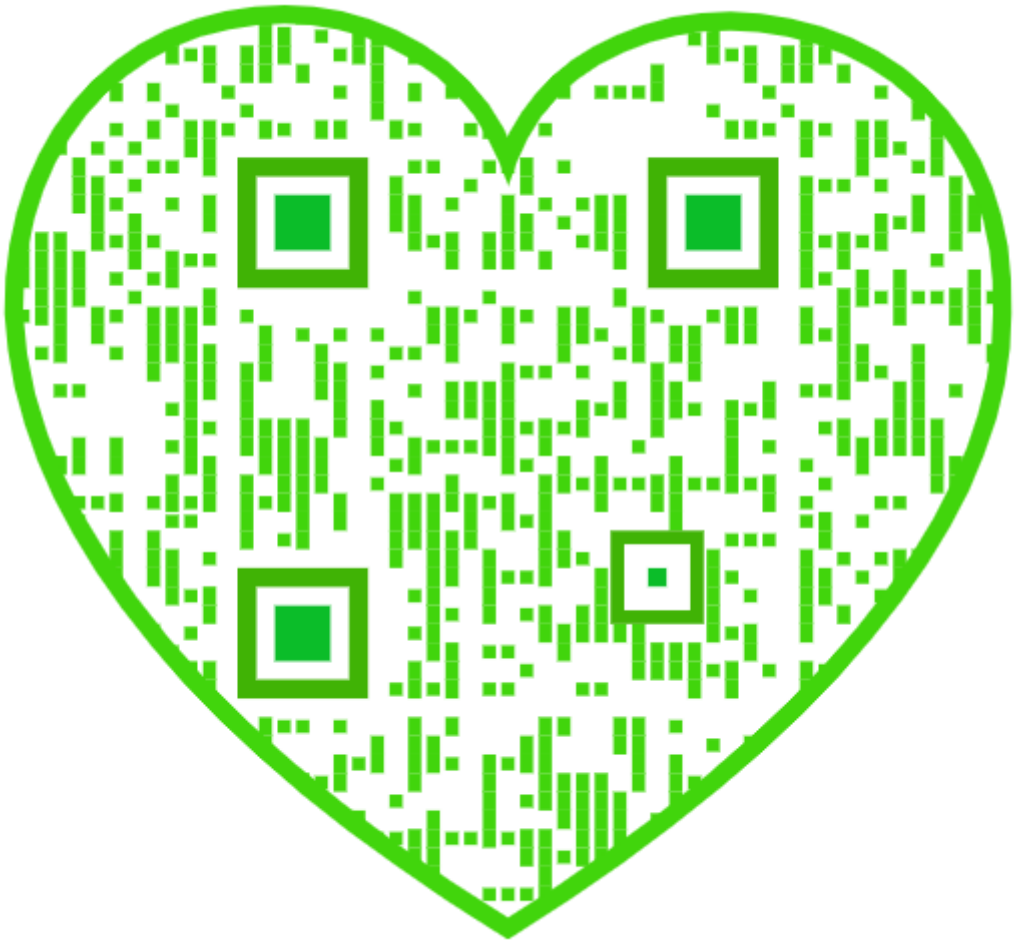

Issued from the United States Patent Office

FOR THE WEEK ENDING MARCH 2, 1858.

[*Reported officially for the Scientific American.*]

BELLOWS—Jacob Arndt, of Wheeling, Va.: I do not claim the movable wings, with the springs attached, as they are but a modification of the well-known arrangement of metallic packing.

But I claim the combination of the trunk, A A A A, with the lever plunger, E E E E, the upper plunger, N N N N, and the blast gage, Q Q Q, substantially as and for the purposes set forth.

STONING CHERRIES—Joseph Baker, of Washington County, D. C.: I claim the perforator, h, by which the stone is extracted from the pulp of the fruit, and the beveled feeding slide, O.

I also claim the combination of perforators h, the bent lever, P, and feeding slide, O, operated and arranged in relation to each other as described, and for the purpose specified.

MANURE WAGONS—J. W. Barnes, of Murfreesboro', N. C.: I claim converting the broadcast distributor into a drill machine by reversing the axle, substantially in the manner set forth.

I also claim the movable side or end, e, in combination with the sliding bottom, g, as set forth, whether the machine is used for a drill or broadcast machine.

METALLIC CARRIAGE WHEELS—Waldren Beach, of Baltimore, Md.: I do not claim to be the first inventor of any one of these features, nor ask a patent therefor.

But I claim the combination and arrangement of the several parts as described, whereby I have made a strong, light, durable, and cheap metallic wheel, which consists of but three essential parts, while I have preserved all the important qualities of a good carriage wheel in the highest degree.

COMPOUND PENDULUM—Dana Bickford, of Westerly, R. I.: I claim the arrangement and combination, substantially as shown and described, of the rods, E, levers, G, and the bob. B, so that by the expansion and contraction of rods, E, the position of bob, B, upon the rod, A, will be changed for the purpose set forth.

[This is an improvement on the kind of pendulum known as the "gridiron" construction, and it consists in a certain means of correcting the compensation. It is impossible to fully explain it without diagrams.]

METHOD OF BENDING SHOVEL HANDLES—Thomas Blanchard, of Boston. Mass.: I do not claim, broadly, bending wood, so that its fibers are prevented from being distended longitudinally while being bent, for this has been previously done, and was formerly patented by me.

But I claim the method of confining the wood while being bent, to wit: by means of a key, i, arranged to pass through straps, E F, and also through the handle, H, substantially as and for the purposes set forth.

[The patentee of this method of bending is the celebrated Thomas Blanchard, a veteran inventor. He had a patent granted to him Jan. 12, 1820, for gun-stock turning, and which is still in existence, having been extended by special act of Congress. By the invention now patented, he bends wood for shovel handles, chair legs, and similar purposes, without injuring the fibers of the wood by straining them longitudinally.]

MACHINES FOR BREAKING COAL—Aquila Bolton, of Port Carbon, Pa.: I claim the arrangement shown consisting of the perforated, internally ribbed or toothed conical chamber, C e, C' e', revolving in one direction, and the toothed shaft, or roller, B d, revolving in an opposite direction, for the purpose of breaking coal, as specified.

[This invention consists in breaking coal and discharging it as fast as broken, by means of the combined action of a shaft or roller armed with teeth or cutters and revolving in one direction, and a perforated hollow conical cylinder furnished with vertical slotted ribs or partitions, and revolving in an opposite direction to that of the shaft or roller. This arrangement avoids grinding or crushing the coal as in other machines which have one breaking surface stationary, and the other moving. It also affords facilities for breaking the coal to all merchantable sizes in one machine. We certainly think well of the contrivance, and believe it is a step in advance of the machines in use.]

PADDLE WHEELS—Andrew Buchanan, of New York City: I do not claim the closing of the spaces between the floats, as I am aware that paddle wheels have been made with peripheries formed like cog wheel stars and in other forms with the said spaces closed.

But I claim the arrangement of the ventilating pipes c c, substantially as described, in combination with the arches, D D, between the floats, for the purpose set forth.

[This paddle wheel has paddle floats of the ordinary form, with a series of arches placed between, but not connected with the floats, for the purpose of preventing the breaking of the water by the action of the floats, and causing the water to be kept in a compact condition behind the floats during the operation, and thus obtaining a better effect. There is also an arrangement of ventilating pipes for the escape of air from under or within the arches.]

HARVESTERS—J. S. Butterfield, of Philadelphia, Pa.: I claim first, The reversible cam, Q, constructed as shown, namely, with the grooves, i k, in opposite sides, so that the sickle may be driven with either of two different speeds, for the cutting of either grass or grain as may be desired.

Second, The bars, E E F, with the finger bar, J, and platform, K, attached in combination with the lever, G, and wheel, H, the whole being constructed as described, and arranged relatively with each other and the axle, A, as shown for the purpose set forth.

[This invention consists in a peculiar manner of hanging and arranging the reel, the means employed for raising and lowering the sickle, and also in the device employed for driving the same, so that the machine is rendered very efficient in its operation, simple in construction, and the sickle is capable of being graduated as circumstances may require.]

HARROWS—Orman Coe, of Port Washington, Wis.: I claim the combination, with the bars, A, of a harrow frame of a series of revolving circular, conical or conicave forked harrow teeth, said teeth being arranged oblique to the line of draft, and operating unitedly, substantially as and for the purposes set forth.

METALLIC TIES FOR COTTON BALES—Frederic Cook, of New Orleans, La.: I claim the friction clasp or buckle for attaching the ends of iron ties or hoops for fastening cotton bales and other packages, so that the ties are prevented slipping by the friction against a certain portion of the buckle.

I claim also the looping of the ends of iron ties or hoops or bales into a buckle, by the form of which they are prevented slipping by friction, when the strains of the expansion of the bale comes on the ties. The ends of the hoops or ties not being attached together in any way, the connection being formed by a distinct buckle or friction clasp.

I also claim the described "slot" cut through one bar of clasp, which enables the end of the tie or hoop to be slipped sideways underneath the bar in clasp, so as to effect the fastening with greater rapidity than by passing the end of the tie through endways.

ECCENTRIC FOR OPERATING STEAM VALVES—Benjamin Carley, of Paterson, N. J.: I do not claim as my invention the mode described of varying the point of cut-off or reversing the engine.

But I claim, in combination with the method of shifting the eccentric, or its equivalents, to vary the point of cut-off or reverse the engine, substantially as described, the so forming the ways or slides, substantially as described, that by the one motion and mechanism the required lead shall be given to the valve motion by the act of shifting the point of cut-off or reversing the engine, as described.

BOLT MACHINE—Henry Carter, of Pittsburg, Pa.: I claim, first, The use of a stationary heading tool arranged centrally to the converging dies, in the manner substantially as described.

Second, The use of a swinging hammer for upsetting the head, in combination with the converging side dies and corner dies, arranged and operating substantially as described.

HARVESTERS—W. L. Childs, of Piermont, N. Y.: I claim the arm, P, bars, T W, and slide, U, operated and arranged as shown or in any equivalent way, so that by their joint operation the twine or cord, a', is adjusted around the sheaf, cut off from the main portion, and the ends twisted and tucked under the band as described.

I also claim, in combination with the above binding device, the rake, G, operated as shown, so as to have a proper relative movement with the parts constituting the binding device, as described, whereby the cut grain is raked into the receptacle, Y, at the proper time.

I further claim the discharging device formed of the lever, Z, actuated from the axle, M, through the medium of the lever, B', and rod, C', when used in connection with the rake and binding device, as described.

[In this harvester a rake is employed in connection with a novel arrangement of parts, whereby the grain as it is cut by the sickle and thrown upon the platform, is raked into a proper receptacle—a suitable quantity at a time to form a sheaf or gavel—and then bound with a cord. The device is operated automatically from the driving wheel of the machine.]

CONTINUOUS METALLIC LATHING—Birdsall Cornell, of New York City: I am aware that narrow angular strips of sheet metal have been combined with each other in such a manner as to form surfaces for the reception of a coating of plaster, and that patents have been granted to Palmer Sumner and to John B. Cornell for varieties of such combinations.

Therefore, I wish it so be distinctly understood that I claim forming metallic surfaces for the reception of castings of plaster, &c., of sheets of metal after they have been swaged into alternating elevations, and depressing of a retaining shape substantially as represented in the drawings.

OPERATING WINDOW BLINDS—Theodore Christian, of New York City: I claim tightening the straps, d, by adjusting the pieces, e e, as described.

[The slats of one or more panels of a blind can be operated by this invention, in which a series of pulleys are applied within a cavity in one of the stiles on one side of the blind, one on each tenon of the slot, and an upright rod to which are connected the ends of a series of short bands, one of which passes round and is secured to each of the pulleys, the rod being also within the cavity in which the rollers are contained.]

FIELD FENCE—P. S. Carhatt, of Collamer, N. Y.: I claim the mutually binding connection of panels of portable fences, consisting of rails having angular grooves so as to lap over and to fit into the batten, said rails being arranged in relation to the batten in the manner and for the purposes specified.

Second, In combination with pairs of panels connected in the manner set forth, I claim the shoes or sockets made of planks of triangular form, fitting into the spaces between the batten of both pannels so as to secure their relative position in a permanent manner, substantially as set forth.

MACHINE FOR CUTTING THE MOLDING FOR SASH—O. K. Collins, of Murfreesboro', Tenn.: I do not claim the separate devices employed by me, but I believe that my machine, as a whole, is new, and on account of its functions, as well as its simplicity, cheapness, efficiency and durability, it is a substantial improvement over all other planing machines heretofore invented.

I claim the two-fold and adjustable planes in combination with the removable posts, M, and a reciprocating way, C, for the purpose of cutting moldings of window sashes, substantially as set forth.

APPARATUS FOR SUPPLYING WATER TO BOILERS—J. N. Dennisson and Thomas Sealy, of Newark, N. J. Patented in France Aug. 26, 1557: We claim the combination of two chambers with each other and with a steam boiler by means of pipes, stop-cocks and valves, constructed and operating substantially as set forth, in such manner that the two chambers act alternately and interchangably as receiving and distributing reservoirs to receive feed water to heat it by the discharge of steam from the one vessel to the other and to feed it to the boiler.

We also claim the combination of the said apparatus with a steam heating apparatus situated lower than the boiler, so that the condensed water is raised and returned to the boiler, substantially as set forth.

HARROWS—W. DeWitt and O. D. Barrett, of Cleveland, Ohio: We are aware that the use of a weighted roller, or its equivalent, upon the periphery of a circular harrow, was patented by S. S. Hogle, in March last. We do do not claim the use of a weighted roller, or its equivalent, as specified by him.

But we claim the arrangement of center pin, B, draft bar, C, arm, E, and weight, G, with harrow, A, in the manner and for the purpose specified.

SASH BALANCE—Thomas Denham and J. W. Briggs. of Cleveland, Ohio: We are aware that fire alarms and burglar alarms are not new, and we do not claim the separate devices employed by us, but we believe that the particular combination invented by us is new, and a substantial improvement upon all alarms heretofore known.

We claim the combination of the alarm with the sash balance and window sash when constructed and arranged substantially as described, for the purpose of alarming the inmates of a house when burglars open the windows, as set forth.

HILL SIDE PLOWS—Samuel Dennis, Jr., of Jasper, N. Y.: I claim the combination of two moldboards and shares, with a single stationary land side in the construction of a hill side plow, substantially as described for the purpose stated.

LOOP CHAINS FOR JEWELRY—C. W. Dickinson, of Newark, N. J.: I claim the concavo-convex links made entire, as set forth.

SHAPING AND PUNCHING METALS—J. C. Dickey, of Saratoga Springs, N. Y.: I claim the conical die, a, in combination with the finishing die, b, and punch, D, when constructed and operating in the manner and for the purposes set forth.

FARM GATE—Andrew Dietz, of Raritan, N. J.: I do not claim the construction of gates, so that they can be operated or shut without alighting or dismounting.

But I claim the combination or arrangement of the rotating incline, h, and friction roller, g, substantially as described, for the purpose of causing the gate to open or shut of its own weight, according to the position of such incline, h, and in connection therewith the arrangement of the cords, c c', m m', and their springs, or their equivalent, to raise the gate, and turn the incline, h, the whole substantially as and for the purposes set forth.

METHOD OF RAISING SUNKEN VESSELS—F. G. Ford, of New York City, and Pascal Plant, of Washington, D. C.: We do not claim the employment or use of inflated bags for raising sunken vessels, for such means have been previously used.

But we claim the chain, E, constructed substantially as shown and provided with one or more internal chains G H, and used in connection with the tube, C, and chain, E, to wit, the framing, B, provided with the pulley, I, and pinions, E D, which gear into the racks, a e, made respectively in the tube, C, and chain, E, substantially as and for the purpose set forth.

[The means employed for raising sunken ships by these inventors is a chain so constructed and moving through a tube that it can be forced underneath the keels of sunken vessels in a sinking state, and by means of inflated bags or other suitable air vessels which are attached to the chains that are passed underneath the vessels; the same if sunken will be raised by their buoyant power, or if in a leaking or sinking state made sufficiently buoyant to keep afloat until succor arrives or the leak stopped. The invention may also be applied to raising of obstructions from the beds of rivers and harbors, such as snags, boulders, and the like.]

SASH FASTENERS—William Forbes, of New York City: I claim the described device marked A, secured to the sash, operated, constructed and arranged, substantially for the purpose and in the manner set forth and described.

REGISTERS FOR HOT AIR FURNACES—J. W. Geddes, of Baltimore, Md.: I am aware that it is a common practice to surround stove pipes where they pass through the walls and floors of buildings with collars in "flue pots" of earthenware and also with metallic jackets, and I lay no claim to such devices.

But I claim the mode set forth of constructing the fire-proof settings for registers for hot air furnaces, the same consisting in the employment of one or more ventilated casements surrounded by a perforated cap of non-conducting incombustible material, as described.

I also claim the flaring tubular terminations, F', of the passages, H, for the purposes set forth.

COFFINS—Daniel and S. E. Hooker, of West Poultney, Vt.: We claim the employment of a skeleton frame composed of strips of angular metal extending along the angles of the coffin and firmly secured together, so as to furnish the main support of the coffin, and at the same time a proper means of attaching the slab or stone, and of securing tight joints as specified.

We also claim the combination of this frame with a thin slab of slate or other stone whereby a coffin of superior strength, durability and lightness is produced.

MOWING MACHINES—Cha. Howell, of Cleveland, O.: I claim the method of connecting the truck to the main frame of a reaper or mowing machine and of regulating the hight of the cut, &c., substantially as set forth.

ECCENTRIC EXPLOSIVE SHELLS—Wm. W. Hubbell, of Philadelphia, Pa.: I claim the combination of the flat-based segment or bridge piece behind, the flat-based reinforce around the fuze hole and the thinner sides or walls of the shell, with the external surface of the shell smooth and spherical, as described.

PAPER BAGS—Jacob Keller, of Fairview Township, York County, Pa.: I claim the treadle, B, shaft, C, wheels, D G, roller, H, lever, J, roller, L, folders, N O, and the devices, P Q R S T, as arranged in combination substantially as described for the purpose of making paper bags.

HOMINY MORTARS—John Keezer, of Chillicothe, O.: I disclaim wire gauze mortars used for hulling rice as constituting no part of my invention.

I claim the construction of mortars for operating on moist corn, with perforations beveling outward and presenting sharp edges on the interior, substantially as and for the purpose specified.

BOOT TREES—R. L. Lewis, of Milford, Mass.: I claim combining the backs with the axial stretching rod by means of the inclined guides, F, and crossheads, B, or other equivalent means, so that the backs can be readily changed in the manner and for the purposes set forth.

MACHINE FOR CUTTING BARREL HEADS—Wm. Manning, of Rouse's Point, N. Y.: I do not claim separately or in itself considered any of the parts described.

But we claim the arrangement as shown and described of the annular plate, F, disk, I, hub, J, and cutters, l l, whereby the stuff is held between the annular plate, F, and the disk, I, and is simultaneously operated upon both sides, without changing the position of any part of the machine.

[This machine cuts barrel heads very expeditiously, while it is extremely simple and capable of being operated with the greatest facility by any person of ordinary ability, there being no parts liable to get out of order, and the manipulation is readily understood.]

MACHINE FOR CUTTING BARREL HEADS—J. P. Mattison, of Scriba, N. Y.: I claim automatically transversing the disk cutters in any manner substantially as described, for the purpose of operating upon the heading, either at the same time or alternately.

HYDRANT—John Parham, of Philadelphia, Pa., and S. P. Parham, of Trenton, N. J.: We claim the peculiarly combined arrangement for a fire plug or street hydrant, consisting of the case or cylinder, A, of the plug or hydrant, which has its valve seat, E, on a level with the bottom of the waste passage, N, so that the whole of the waste water may discharge, and its main or supply pipe, B, a short distance above the lower end of the cylinder, so that the valve, F, may be let down below out of the way of the free passage of the water, and the hollow revolving but not rising and falling female nut, J K, which is made to operate the screw rod of the supply valve, so as to force it down into the reception chamber, O, below the supply pipe, B, and the waste valve, M n, which is coupled loosely and peculiarly to the main valve rod, a, and fast to a spring, e, so as to be held closed when the main valve is opened, and opened, when it is shut, all substantially as and for the purpose set forth.

[The object of this invention is to prevent the water being obstructed by the valve and foreign substances which the water may contain when the valve is open and the water is passing up through the main pipe into the plug cylinder. The invention is also designed to facilitate the moving or operating the valve and frost rods. It forms a very good hydrant, one that will not freeze, and is easily operated.]

CORN HUSKERS—Warner Pickett and Andrew Hills, of Nangatuck, Conn.: We are aware that the cylinder has long been used, and that the circular saw and the inclined plane, and various forms of curves are well known in mechanics, and that each have been set at various angles. We therefore do not claim either of them, or their angles as such, as our invention.

But we claim the combination of the inclined cylinder, B, with the curved bar or trough, C, and the clearer, D, when the whole is constructed, arranged and made to produce the result, substantially in the manner and by the means set forth.

HYDRANT—James Powell, of Cincinnati, Ohio: I claim, first, The combination of two plungers, E F, working in line with each other, and the double chambered cylinder, C, having two escape passages, substantially as and for the purposes described.

Second, The combination of the peculiarly shaped slotted cam, L, and the crank, J, with the two plunger shafts, G H, substantially as and for the purposes set forth.

[This invention provides a hydrant which prevents any waste of water, and thus saves the foundations of buildings from being undermined, avoids freezing in winter, and affords facilities for getting at and repairing its valves without digging up, and which as a whole is very durable and perfect in its action. We should consider this a useful improvement for large cities where fires are frequent, and much loss ensues from the hydrants freezing.]

SEEDING MACHINES—Aaron Ring, of Westbrook, Me.: I do not claim sowing seed by centrifugal force, for that has been done before. Neither do I claim the distributing tubes in and of themselves alone, for they have been used in sowing seed broadcast.

Neither do I claim the bag hopper in and of itself, neither do I claim the crank in and of itself alone, neither the shaft separate and alone, nor the slide at the bottom of the hopper, neither do I claim the revolving head alone.

But I claim the combination of these, substantially as and for the purpose set forth.

METHOD OF SETTING SUGAR KETTLES—Honore Roth, of Iberville Parish, La.: I claim setting the kettles known as the "battery" and "flambeau" over separate furnaces, in communication respectively with the kettles denominated the "sirup" and "propee," and both communicating with the "grande," or first kettle of the series, on opposite sides of a division wall reaching nearly to the bottom of said kettle, substantially as and for the purpose set forth.

SUBMARINE GRAPPLES—Thomas Sheehan, of Dunkirk, N. Y.: I am aware that jaws have been previously applied to springs, and various plans have been devised for retaining the jaws in a distended state, and liberating them when desired; and I therefore do not claim, broadly, such device, irrespective of the peculiar means employed, as shown.

But I claim the employment or use of the segment rack, M, and pawl, h, applied to the levers, D D, of the jaws, and actuated by means of the levers, K I, and cords or chains, J H L, substantially as and for the purpose set forth.

[Full particulars of this invention will be found on another page.]

MACHINE FOR FORMING SHEET METAL PANS—E. A. Smead, of Tioga, Pa.: I am aware that dies have been used for swaging or forming dishes, cups, boxes, and similar articles; and I do not claim, broadly, the employment of dies without reference to the peculiar arrangement and construction of the same.

But I claim the combination of the two dies, F G, when arranged as shown, viz., the lower die, G, being provided with the movable side pieces or strips, e, actuated by the guides, i, as the die descends, the upper die being attached to the frame, C, actuated by the cam, D, or its equivalent, for the purpose specified.

[This is essentially a labor-saving machine; it takes the metal plates and bends the sides up, and makes a good pan without any labor being required, except that expended to operate the machine, which can be done, of course, by any one who has sufficient strength, no skill being required. The same inventor secured a patent on June 16, 1857, for a similar invention.]

HARVESTER FINGERS—Henry C. Smith, of Cleveland, Ohio: I am aware that guards for the cutters of harvesters have been made with cavities of various forms, or open both above and below; but for want of strength in some of their parts, or from liability to clog, they are subject to objections which I believe are obviated in my improvement, (which forms a new article of manufacture,) which can be applied to any harvester of the usual form of construction.

I claim the bars, D D, with the opening, F, the cone, b c d, with the cone cavity, E E, so formed in relation to the bar, D D, that the under side of the cone shall project below the said bars attached to the shank, A. This I claim when constructed and arranged substantially as set forth, for the purpose described.

CALENDAR CLOCK—Holly Skinner, of Huron, Ohio: I claim first, The extra movable tooth, m, and leap year wheel, G, applied to the year wheel, F, to operate in the manner described, for the purpose of regulating the effective length of the tooth which represents the month of February.

Second, The arrangement of the month wheel, C, its attached pinion, t, and pin, 4, the rack bar, H, and its pawl, q, the spring, v, or its equivalent, the lever, D E, and its stud, i, or its equivalent, the catch, K, and the stop, 7, the whole being applied to operate upon and be controlled by the year wheel of a calendar movement, as and for the purpose set forth.

[We have noticed this invention in another portion of this journal.]

BEE HIVES—Solomon Stansberry, of Knoxville, Tenn.: I do not claim inclosing one or more hives within a case or box, A, for this has been previously done.

Nor do I claim spare honey boxes, C, applied to the hives, B, for these are commonly used.

But I claim the cylinders, D, placed within the hives, or below them, and fitted within concaves, e g, arranged in any proper way, so as to operate substantially as and for the purpose set forth.

[This invention consists in the peculiar means employed for destroying within the hive the eggs of the bee moth, thereby preventing their accumulation, and consequent destruction of the hive by them.]

GRINDING MILLS—Hosea Southwick, of Little Cooley, Pa.: I do not claim the friction rollers on which the main shaft runs.

I claim the mode of grinding all kinds of grain into flour and meal with a perpendicular stone fitting into a stone concave, and a counter stone or crusher on the top of the runner near the upper end of the concave, said counter stone or crusher is to crush the grain before it drops between the runner and the concave, thereby grinding faster and with much less power than common mills.

HARVESTERS—Isaac Van Doren, of Somerville, N. J.: I am aware that sickle beams have been constructed with a sort of cap to protect reversible knives, and therefore I do not generally claim so constructing the sickle beam as merely to furnish a cap for the sickle.

But I claim the arrangement and construction of a sickle beam, substantially as described, so that it shall hold and keep firm the guard fingers, and also by means of the arched lip, C, keep the teeth close to the fingers, and permit the use of an open guard.

BOXES AND JOURNALS FOR RAILROAD CAR AXLES—Isaac P. Wendell, of Philadelphia, Pa.: I am aware that intermediate collars have been heretofore used for the purpose of lubricating axles; but in all instances, such collars have fitted tightly into recesses in the upper bearing, which thus prevents efficient lubrication. I disclaim, therefore, the exclusive use of a central lubricating collar.

I claim employing, in connection with the boxes and journals of car axles and other shafts, a central lubricating collar, revolving in an oil chamber formed in the lower bearing, in combination with a recess in the upper bearing, when the said recess is wider and deeper than the collar, as set forth, and for the purpose specified.

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RAKES FOR HARVESTERS—Isaac Van Doren, of Somerville, N. J.: I claim the arrangement or combination of the geared wheel, D, having spur and face gearing, as described, and shaft, H, with its pinions, F F′ J, in connection with the supporting roller, B, and expanding levers, M, substantially as described, for the purpose of operating the rake, N, by the roller, B.

I also claim, in connection with the rake, N, when operated as described by means of expanding levers, M, the trips, K K, for the purpose of throwing the teeth in a vertical position to carry the grain from the platform.

MANUFACTURE OF SCYTHES—Harvey Waters, of Northbridge, Mass.: I wish it to be distinctly understood that I do not make any claim to such mode of procedure, or to the arrangement of dies specified under the present application.

Nor do I wish to be understood as limiting my claim of invention to the said new manufacture of cutting instruments known under the term scythes, as the peculiar edge thus produced is applicable to other cutting instruments.

What I claim is the new manufacture of cutting instruments, substantially such as described, having the metal forming the cutting edge in the condition resulting from the previous crinkling or corrugating of the metal at right angles, or nearly so, with the line of the intended cutting edge, and then flattening it by a swaging operating in such manner that the crinkles or corrugations shall not be straightened out by simply bending, as described.

LIME KILNS—Abner B. Weeks, of Rockland, Me.: I do not claim any of the devices shown in the patent of Aaron Jeffries, dated April 21, 1857; nor any of those shown in the patent of Isaac Richardson, dated February 21, 1840.

Nor do I claim a single stack, having at its top a single mouth of discharge, and at its bottom or lower part a wall to extend above such bottom, about one-third the hight of the stack, the same being as shown in Hebert's Cyclopedia, Vol. 2, page 16.

But I claim my improved arrangement of a single hopper with respect to two separate stacks, such being placed at or over their upper ends, and so as to flare and increase in width from them upward, and communicate with them as represented and described.

I also claim arranging air or cooling passages horizontally, or with the inclinations as described, under broad flat hearths of any suitable material, in the manner and for the purpose as set forth, and in combination and connection with the furnace of a lime kiln, by means of pipes or passages constructed and relatively arranged as specified.

HORSE SHOES—Elbridge Wheeler, of Marlborough, Mass.: I claim the described horse shoe, the calks and shoe being of one piece of metal, formed by drawing down the shoe, and without welding or turning up.

BURGLAR'S ALARM—William D. Wright, of Baltimore, Md.: I claim confining a torpedo within a chamber or box, between weights or slugs, so that when said box drops, and strikes against anything, the force or rebound of the weights shall cause the torpedo to explode, and thus cause an alarm, as set forth.

HORSE SHOE MACHINE—Harry A. Wills, of Keeseville, N. Y.: The rollers, B C, mold, E, guide rollers, c, and segment, T, have been previously used, and were employed in the machine of Young & Titus, previously alluded to; I therefore do not claim such parts.

But I claim, first, The peculiar arrangement of the shears, M N, in the relation to the upper roller, B h, and the feeding bar, P, so that the cutter shall be brought into action, and the cutting-off of the blank effected in the revolution of the upper roller, B′, by means of the projection, h, on the same, and the blank, when cut off, left in a position to be certainly fed between the rollers, substantially as set forth.

I further claim, in combination with the guide rollers c, attached to the bars, H H, the auxiliary spring guides e, attached to the bars, J J, and arranged to operate conjointly with the guide rollers, c, as shown and described.

I also claim loosening or shoving back the blank, F, on the mold, E, just previous to its entering the female die, G, by means of the vibrating or loosening bar, J, for the purpose set forth.

[This is described on another page.]

PIANO LOCK—Nathaniel Wilton, of Boston, Mass.: I claim the construction of the bolt plate, B, with the slots, 1 and 2, of the form shown, whereby said plate is guided in its two positive motions, as described, and actuating said bolt directly by the key in its motions, as set forth.

MACHINES FOR REGULATING THE SUPPLY OF ROVING TO SPINNING MACHINES—John B. Winslow, of New Bedford, Mass.: I claim the combination of the secondary clutch and the main clutch made to operate together upon one shaft, V, and to be operated by the fibrous material acting in the draw-rollers, substantially as specified, the same causing the shaft, V, and the bevel gear U, and, of course, the delivering belt, to have their speed varied as circumstances may require, as before specified.

SEWING MACHINES—Joshua Gray, of Medford, Mass., (assignor to himself and George O. Brastow, of Somerville, Mass.): I claim the described device for distending the loop, consisting essentially of the sliding bar, B, and the vibrating arms, A and c, operating in the manner substantially as set forth.

LOCKS—John M. Perkins, (assignor to Robert M. Patrick,) of New York City: I claim, in combination with a set of tumblers, arranged and operating in the manner described, a set of stationary bars at one end, and a set of washers at the other end of, and interposed between, said tumblers, for the purposes specified.

I also claim the yoke embracing the whole set of tumblers, in combination with a pin, or its equivalent, projecting out and through the case, for the purpose of enabling the tumblers to be shoved together so as to cover each other, whereby the slots of the tumblers are caused not to coincide, thus preventing the bolt from being withdrawn.

METHOD OF OPERATING SCROLL SAWS—Henry F. Shaw, (assignor to himself and Moses H. Gragg,) of Boston, Mass.: I claim the use of the two sets of double arms, c c′, and D D′, constructed substantially as described, and attaching the two ends of the saw to the centers of the strips, E and H, which unite the extremities of said arms, substantially as set forth and for the objects specified.

SEWING MACHINES—Amos W. Sangster, (assignor to Victor M. Rice, James Sangster and Eliza Remington,) of Buffalo, N. Y.: I do not claim imparting a feeding or forward motion to the cloth, or other material, while being sewed, by means of a wheel which moves the cloth while revolving, as that has been done before.

But I claim the specific mechanism described, consisting of the frrame-work, slide and toggle-joint designated by the letters, H4 I2 I I L K M M′ N O and R, arranged and operating in the manner and for the purpose specified.

RE-ISSUES.

MACHINE FOR MAKING BARRELS AND OTHER CASKS—Isaac Crossett, of Bennington, Vt. Patented July 1, 1844: I claim the vibratory block or bed, D, adjustable gage, C, and knife or cutter, B, arranged relatively with each other, so as to operate as and for the purpose set forth.

RUNNING GEAR FOR LOCOMOTIVE ENGINES—Septimus Norris, of Philadelphia, Pa. Patented September 26, 1854: I claim so arranging the running gear of a locomotive engine as to make the driver support its entire weight, in combination with a pivot truck vibrating freely to guide the engine, substantially as described.

LIFE-PRESERVING RAFTS—Lorenzo Taggart, of Philadelphia Pa. Patented January 26, 1858: I claim a life-preserving raft formed by the ordinary water casks or tanks of ships having eyes secured thereto, so as to be air-tight, and connected by spring stay rods, substantially as described, in combination with a rope net-work and canvas sheet, operating as and for the purpose set forth.

Silver and its Uses.

This metal possesses great interest. Its frequent mention in the Scriptures—the shekels of silver, and the talents of silver—indicates its ancient use and application as money. It is one of those metals which the alchemists of old termed "noble" metals, because they found that it could not be rusted; moreover, they could not dissolve it in any menstruum they possessed. Fire only made it brighter. Allusion is made to this fact in the Book of Job, to illustrate the triumph of a good heart over misfortune. Silver is found in all parts of the world, and England yields its share. Bishop Watson, one of our early chemical writers, says that the silver which was procured from the mines in Cardiganshire by Sir Hugh Middleton, amounting to £2,000 value per month, enabled him to construct that valuable work which we call the New River, for the purpose of supplying a portion of London with water. The bishop also mentions that a mint was established at Aberystwith for coining silver. In the English mines this metal is found mixed with lead, from which it is separated by a very simple process invented by Mr. Pattison, of Newcastle. The mixed metal is melted in an iron pot, and is then allowed to cool. The silver "sets" before the lead, and is then separated by simply straining it through a colander. Silver can be beaten out into leaves so thin that one grain of it can be made to cover a surface of more than fifty square inches. Wire also can be drawn from it finer than a human hair. In these respects it has a nearer resemblance to gold than any other metal. With the mechanical qualities of silver most readers are pretty well acquainted; but as very little is known of its chemical qualities, it may be well to mention them. Silver has, as it were, a determination to exist in no other form than in the metallic state in which we generally see it; and although the chemist may dissolve it, and overcome its "nobility," yet it is so prone to assume its natural state, that even daylight will restore it to its pristine beauty. It is here that chemistry shows its great power in adapting a peculiar property of a material to some use in the arts and manufactures. So we see that silver is the main instrument in the photographic art. Silver is dissolved, some salt is added, you look at it, and the result is that your shadow is their indelibly printed. The poets may well liken soft-flowing rivers to "silver threads covering the green velvet of the earth;" but such types are prosy when we compare them with the painting after life produced by a sunbeam on a fabric imbued with silver. Again, how carefully the good housewife marks her linen! She well knows how it is thus preserved for her own use, but perhaps is not aware of the fact that the indelible ink is nothing more than the solution of a five-cent piece, for which she willingly pays ten cents. Sometimes a little fungus takes up its abode on the human skin; it grows very fast, but does not cause much pain; nevertheless, it is so insidious that if not carefully watched it would destroy life. The doctor comes, he rubs it over with a little caustic, and health is restored. If you ask what this caustic is called, the answer is "nitrate of silver." SEPTIMUS PIESSE.

Screw-mouthed Bottles.

MESSRS. EDITORS—In No. 23 of the present volume of the SCIENTIFIC AMERICAN will be found an account of an ostensibly *new* invention, recently patented in Great Britain, by which glass bottles are made with female screws in their noses, necks or mouths. If you will refer to the List of Claims published in No. 49 of Vol. X of the SCIENTIFIC AMERICAN, (August 18, 1855,) you will see that Amasa Stone, of Philadelphia, Pa., patented a tool for forming a screw in the nose or neck of a bottle; and this must be the same thing as the English device described in the *Illustrated Inventor*. Mr. Stone's tool has been in use in this country ever since the date of the patent; and I will warrant that all bottles made thereby will tightly hold their corks. If any of your readers want bottles made in that fashion, or a tool for making them, I can tell them where they may obtain either on very reasonable terms. I send you this merely to assure you that "Old England" is by no means ahead of "Young America" in respect to *bottle-noses*.

A SUBSCRIBER.

Philadelphia, Pa., March, 1858.

[For the Scientific American.]

Independent Engines and Pumps in Locomotives.

The able superintendent (Mr. Gregg) at Rome, N. Y., of the Watertown and Rome Railroad, who is always on the *qui vive* in respect to beneficial improvements in the machinery under his charge, has procured one of "Gatley's engines and pump," and placed them on the locomotive *R. B. Doxtaler*, where they occupy a space of only two and a half by one foot each way, just without the "driver's cab," on a line with the engineer's bench, consequently they are always under his eye. The locomotive is of Taunton make. These auxiliaries require no alteration, and the pipe connections appear to be most readily adapted to them.

I am not informed as to the expense, but so far as I am able to estimate, the advantages of them will afford full compensation for any extra outlay. If the ordinary pumps are dispensed with, the additional cost of the engine and pumps will be but trifling. The removal of the present pump fixtures, thereby leaving the other machinery more accessible, is, in my opinion, a very great advantage. To be able to transfer water from the tender to the boiler (which cannot be done by the present pump arrangement in use) while the locomotive is waiting at a station, or when detained in a snow-drift, is an advantage obtained by the independent small engine and pump, too obvious to require further remarks in their favor. X. X. W.

Glucose and Sirup.

MESSRS. EDITORS—I have seen it stated in some papers that glucose or grape sugar never crystallized. This is a mistake. Glucose is made in large quantities from potatoes, in France and England, and has as fine and crystalline an appearance as any sugar. For a long time only sirup could be produced; but it was found at last that if the purified sirup was rapidly evaporated to a density of 45° Baume, and then left to cool slowly in a warm place, it all crystallized in a solid mass, but if stirred occasionally, granular crystals were obtained. This sugar is much used to adulterate other sugar, but its sweetening properties are greatly inferior to cane sugar, the ratio being variously estimated at from two or three to five. Honey is a mixture of grape sugar and fruit sugar. The grape sugar in it is mostly capable of crystallization; it often separates from the fluid portion, and is then said to be candied. This sugar is often found in raisins in the form of small gritty crystals, hence its name. As to the value of the Sorgho Saccharum sirup as a marketable article, I am not prepared to speak, but I do not think it can be sold here. People buy some of it from curiosity, but seldom more than once. I have been assured by those who have the most of it, that they can find no market for it, and they intend to distil it, for which purpose it is very well suited. As many as 225 gallons of moderately concentrated sirup have been produced here from an acre of ground planted with the cane.

Interesting reports on the optical and other relations of crystalline and amorphous grape sugar, and on the other varieties, have been made during the past year by Dubrunfait, Biot, and Bechamp, in France, and by Erdman and Kobill, in Germany.

J. CAMPBELL.

Dayton, Ohio, March, 1858.

Operation on an Elephant.

During the late visit to Hull, England, of Wombwell's menagerie, the elephant "Chubby" underwent an operation which, from its novelty and success, deserves a place among surgical records. For twelve or fifteen months previously, a tumor had been gathering on Chubby's off-side thigh. It grew, and grew, and grew, till at last men began to doubt whether the elephant was an appendage of the tumor, or the tumor an appendage of the elephant; for the larger grew the one, the smaller grew the other. Chubby sickened, lost his appetite, pined away; his skin became "a world too wide." The sobriquet of Chubby, which his once fair proportions merited, grew to be a mockery, and it became evident that unless the tumor and Chubby dissolved partnership, the former would soon be sole representative of the firm. Change of air was tried, but the tumor only derived advantage. Medical advice was called in; but alas it proved another nut which the faculty could not crack. Nine famous "leeches," at nine various stations, tried their juleps and catholicons, but in vain; no one daring to have recourse to the knife with such a patient. Such was the state of matters when Chubby paid his farewell visit, as it was supposed, last Hull fair. His friends, as a last resource, applied to one of their townsmen, a veterinary surgeon, Mr. Tom B. H. Hyde, Jun. Mr. Hyde went, saw, and boldly resolved to use the lancet. The operation was performed a few days after the fair, and lasted two hours; Chubby undergoing it with such fortitude and good sense as could only be derived from a consciousness of its object. The tumor, when removed, weighed five pounds, and one of the fangs had to be searched out with the knife for a foot down the thigh. The operation proved eminently successful. Every fresh bulletin announced his improving health till the latter end of November, when Mr. Hyde pronounced his patient thoroughly restored, and capable of returning to business. Chubby at once took the train to join his friends, Messrs. Wombwell & Co., and when last heard of, his appetite and good looks were the theme of general admiration.

Recent Patented Improvements.

The following inventions have been patented this week, as will be found by referring to our List of Claims on another page:—

GRAPPLING IMPLEMENT—Thomas Sheehan, of Dunkirk, N. Y., has invented an improvement in implements which are employed for grasping submerged articles at the bottom of rivers, wells, &c., and raising them to the surface. The object of the invention is to produce an implement over which the operator may have perfect control, the jaws being allowed to distend to a greater or less degree as may be desired, and also permitted to close forcibly or gradually at any depth at which the implement is capable of being used.

CALENDER CLOCK—H. Skinner, of Huron, Ohio, has invented a new clock for telling the day of the month, the month itself, and hour. It does this by a simple arrangement of mechanism that accommodates itself to the varying lengths of the months, and gives February only twenty-eight days in leap year. It is less complicated than those usually made to effect the same purpose, and does great credit to the ingenuity of the inventor.

MACHINE FOR MAKING HORSE SHOES.—This is an improvement on a machine for the same purpose patented July 29, 1857, by B. Young and S. Titus. The invention consists in the employment of cutting shears and a feeding device, auxiliary guides, and a vibrating bar or loosening rod, arranged and applied to the above machine so as to facilitate its operation, and ensure the perfection of its work, as well as increase the quantity turned out. It is the invention of H. A. Wills, of Keeseville, N. Y.

THE mold on decayed fruit, stale bread, moist wood, &c., is shown by the microscope to be plants, bearing leaves, flowers, and seeds, and increasing with incredible rapidity, for in a few hours the seeds spring up, arrive at maturity, and bring forth seeds themselves, so that many generations are perfected in a day.

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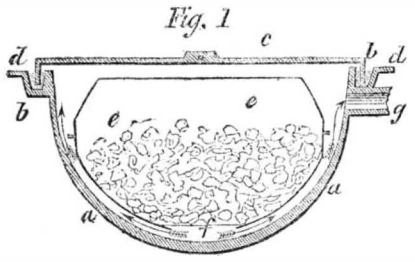
New Inventions.

THE Albany Iron Works, near Troy, N. Y., have just completed an order in the manufacture of iron for the great Russian ship which is being built by Mr. Webb, of this city. The iron is rolled 55 feet long, 5 inches wide, and 7·8 thick.

New Gas Works.

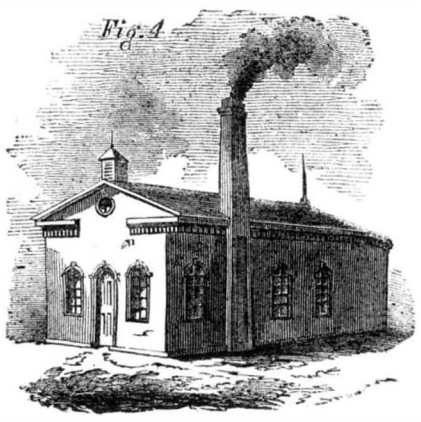
It is conceded by all eminent gas engineers that it must not be supposed that gas is produced *directly* from coal or other materials; for observation leads to the conclusion that tar (a mixture of oils) is the first product, which is subsequently decomposed and partially converted into gas. If the temperature does not rise above a red heat, tar is produced in great quantities with little or no gas. It will be understood, then, that in the retorts where coal, wood, rosin or oil are introduced, a large proportion of the vapors of tar are not decomposed, because they do not come in actual contact with the red-hot sides of the retort, and therefore condense more or less into tar. Engineers have tried to remedy the

Fig. 1



difficulty by lengthening the retorts, and by re-passing the vapor over large heated surfaces. But another and a more serious difficulty arose; for it was discovered that gas which is generated at a cherry red heat is also decomposed if allowed to remain in contact with bodies at that temperature. The gas, thus kept heated, is separated from the carbon which it had taken up when in the nascent state, and is deposited, in the form of a hard coating, against the interior of the retort, or of lampblack on the coke. Thus, instead of tar, useless lampblack and an injurious crust were produced, and the gas itself was of poorer quality; for it is the carbon combined with the hydrogen that gives the flame of gas, oil, tallow and burning fluid their illuminating power. The problem to be solved, therefore, was to contrive an arrangement by which

Fig. 4



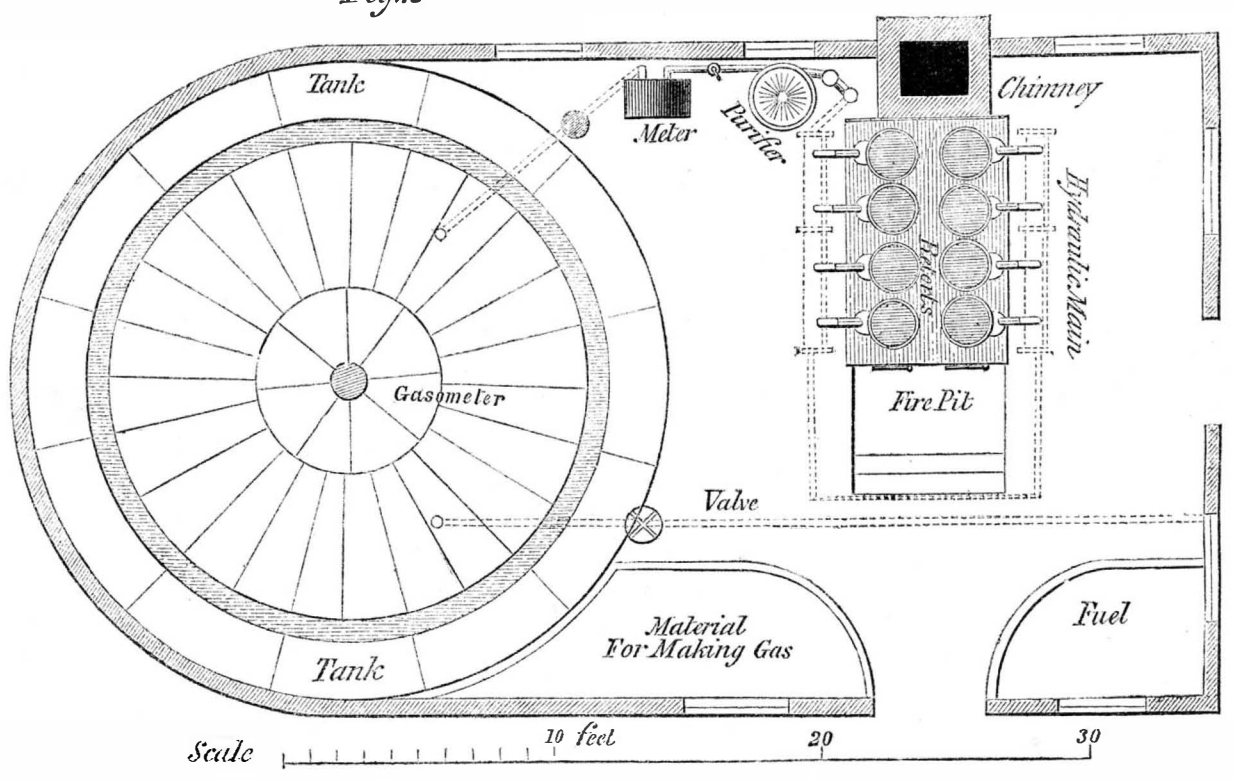
every particle of vapor evolved from the materials should be forced into close contact with the red-hot surface of the retort, but not allowed to remain there after the gas was generated.

In the retort shown, (Fig. 1,) Mr. Aubin claims to have combined the necessary features to produce the desired effect, and to have obtained, besides, other practical and economical advantages, which will be made apparent in the description.

a is the retort. It is nearly a hemisphere, surrounded with the groove, *b*, which is filled with fusible metal, and in which dips the rim of the cover, *c*, which thus affords a very convenient and effectual way of opening and closing the retort perfectly tight. *d* is a flange around the groove, to support the retort upon the brick-work of the furnace, thus making it perfectly independent of it. One to four or more retorts are placed in a row, and are heated by one fire. They generate one hundred feet of very superior gas per hour each, and last, when in constant operation, from six to twenty-four months, according to their distance from the fire. When they are worn out or cracked they can be taken out and replaced in five minutes by the operatives themselves without stopping the working of the bench, and at a cost of from $6 to $10. A bench of three to eight retorts can supply villages and towns of 1,500 to 10,000 inhabitants, and can be worked economically and profitably where not more than one large building is to be supplied, as the heat of the retorts is brought up in about two hours. *e* is the oscillating charger. It is a thin vessel of wrought or cast iron, the lower part of which is the counterpart of the retort, and fits it. It has an opening at *f*, which is partly closed by a perforated plate or otherwise. In the charger are placed the gas-making materials, which can be, according to localities, coal, rosin, grease, asphaltum, tar, cotton seed, cotton waste from machine shops mixed with sawdust, charcoal, or other light substance to graduate the action of the heat. As soon as the heat reaches the materials in the charger, vapors are generated, which, by their expansive force, escape through the aperture, *f*, and slightly raise the charger, which, from its weight, falls back in its place, driving away the newly made gas, which is conducted through the neck, *g*, to the condensers, purifier, and gas-holder, from which it is distributed in the usual way. As long as any volatile matters remain in the charger, an oscillating or dancing motion is kept up, by which it will be understood that a more thorough decomposition of the vapors is secured, since no vapor can possibly escape without passing between two red-hot surfaces; and yet no crust or lampblack is deposited in the retorts, which thus keep perfectly clean for any length of time. When a charge is exhausted (usually after an hour) the charger is lifted out with the residuum, another one filled with fresh materials is put in its place, and the operation is thus continued as long as required.

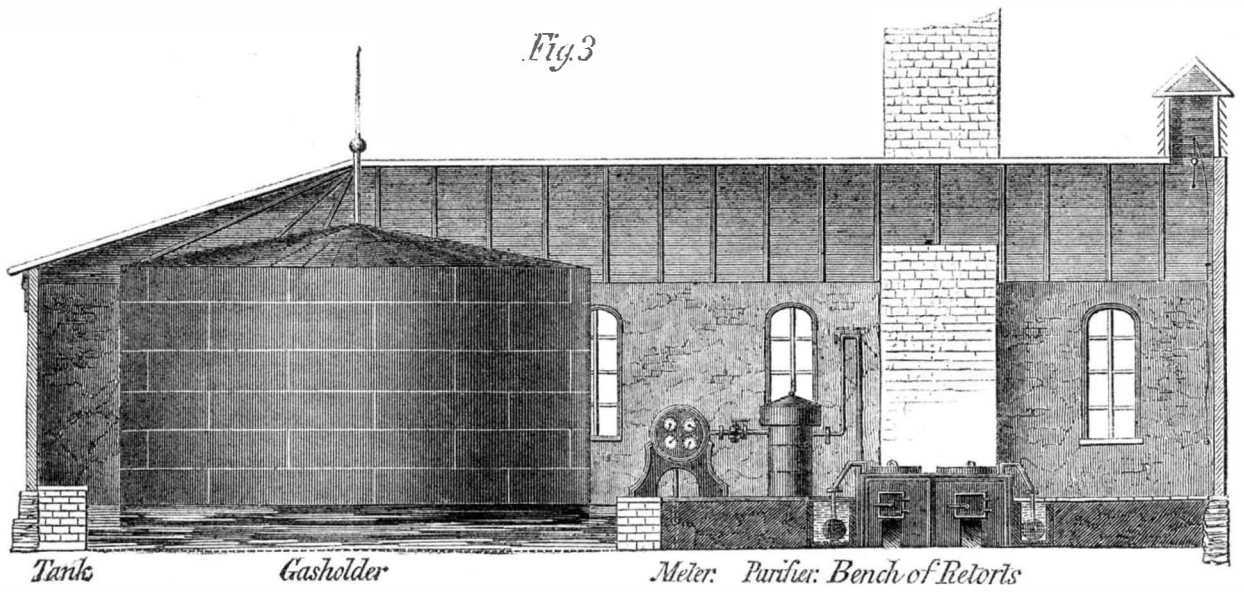
AUBIN'S GAS-WORKS FOR VILLAGES AND BUILDINGS.

Fig. 2



The whole process is a very clean and easy one; and from the construction of the retort it is adapted to all materials and localities. We hear that at Murphreesborough, Tenn., where that system is in operation, they generate a magnificent gas from a mixture of rosin, cotton seed and sawdust. At Palmyra, where these works have supplied the village for the last six months, a very beautiful light is procured from Albert coal, rosin and sawdust.

Fig. 3



The engravings which we give show the general arrangement adopted at Palmyra, though very notable improvements have been introduced in the system by the inventor since these works were erected. It is claimed that from coal a much larger quantity of gas of a more uniform quality is produced than in the horizontal retorts, and in a much shorter time. From rosin, 12 to 18 feet of gas are generated per pound; from tar, grease, bones, &c., an equivalent quantity is also obtained. Indeed, when the rosin has been used, the staves of each barrel containing it afford 400 feet of good gas, and two bushels of charcoal. The arrangement does away with all danger of explosion in the retorts, and of fire from the over-running of the rosin as used in the old process.

Fig. 2 shows the plan of the gas-works complete in one building. When the freezing of water is not frequent in winter, the gasholder can be placed outside. Small villages would find three to six retorts sufficient, instead of eight, as shown in the plan; and for larger cities, a repetition of the bench would be the only modification. Fig. 3 is an interior elevation of the same. Fig. 4 is a perspective view of the building, showing that it can be made ornamental in a village, without an increase of cost.

The Aubin Gas-Works Co. have acquired the different patents for the United States, and sold the right for California, New Jersey, and some smaller territories. For further information apply at the office of the company, No. 44 State st., Albany, N. Y. The patents taken out by Mr. Aubin, the inventor, bear date of January 8, 1856, April 21, and June 23, 1857.

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Scientific American.

NEW YORK, MARCH 13, 1858.

Heating Buildings and Ventilation.

The Fire Marshal of this city, in his semi-annual report, just published, presents a considerable amount of information of very general interest which deserves special notice, on account of the facts and fallacies set forth. He condemns the use of hot air furnaces, now so common, because of their dangerous character in respect to fires, but more so on sanitary considerations. When imperfectly constructed and arranged, they are frequently the cause of fires; yet it is admitted they may be so built as to avoid this danger, but they are always prejudicial to health. It is stated that in the public schools in which they are employed, they produce injury to the health of the scholars, the teachers having to allow numbers of them to go home frequently before the hour of dismissal, on account of severe headaches. For this reason they are condemned, and the abjuration of their use recommended, and as a substitute for them, regarding both health and safety, the heating with hot water by pipes is advocated.

We know that the *abuse* of hot air furnaces in heating apartments is the frequent cause of fires, of nervous fevers, and lung diseases. In very cold weather the plates of these furnaces are generally heated red hot, and as a consequence the air which comes in contact with them is decomposed, and rendered unfit to be inhaled. But will the use of hot water pipes, distributed through a schoolroom or any other apartment, remedy the evil of headaches complained of in the Fire Marshal's report, without the use of other agencies? We are confident they will not. He has overlooked the main cause of the health evils in schoolrooms, namely, the absence of arrangements for proper ventilation. Unless means are employed for a constant supply of pure fresh air to rooms heated by the hot water pipes, it is evident this system must be more hurtful to the health of children in overcrowded schools than the present hot air furnaces. These latter do take in a constant stream of fresh air, and throw it into the rooms, and if some of it is deteriorated in passing over too highly heated surfaces, yet a portion of pure warm air is also supplied, and thus the foul air has not to be ruminated by the lungs as in rooms heated by stoves, and steam, and water pipes unprovided with the means of furnishing fresh air.

The correct method of heating rooms is to throw a constant stream of fresh warm air into them. By keeping hot air furnaces at a moderate temperature, so as not to *burn* the air, they afford the means of properly heating and partially ventilating rooms, but they are too liable of abuse in being easily overheated. Hot water is undoubtedly the most safe and pleasant means of heating air for rooms, but it must be so employed as to meet the conditions requisite for health, by sending a constant supply of warm fresh air into the apartments to be heated.

On page 51, Vol. XI, Scientific American, there is an illustrated description of a hot water heating furnace, which appears to meet all the conditions necessary for heating rooms, both as it relates to safety and health; and were it combined (as it no doubt can be) with means for removing the foul air, it would, in our opinion, be a very perfect system.

As many deplorable accidents have occurred in public schools from defective hot air furnaces, the attention of the Boards of Education is specially invited to this subject. It is fraught with consequences of the highest importance, and deserves early and rigid investigation, as most of the public schools seem to have been erected and arranged in violation of the plainest rules for heating and ventilating them properly.

Mode of Connecting Telegraph Cables.

The accompanying figures represent a new method of connecting the ends of the sections of submarine telegraph cables, invented and patented in England by W. B. de Blaquiere, of London. It has been supposed that the former methods of joining the ends of telegraph cables have been defective, and that when any of them have been broken, it was at the joints, also that other methods did not allow of their being connected quickly, hence the present improvement.

Fig. 1 is a longitudinal section; *a* is a metal tube having at each end a portion, *b*, with a thread upon it attached to the other part by a hinge. The central portion of the tube is filled with gutta percha, and has wires passing through it to connect with the conducting wires of the cables. There is a nut

Fig. 1

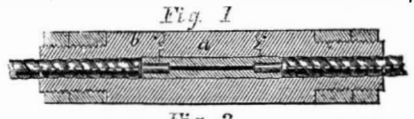
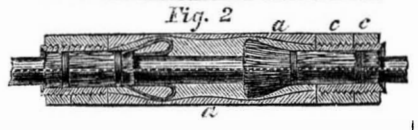


Fig. 2



screwed on to each end of the tube to press and secure the ends of the cable. The junction is made between the sections of the cables by bringing them together in the tube when nuts are slipped over the ends of section cables, thus allowing the jointed parts, *b*, of the tube to be opened so as to permit plastic gutta percha to be filled around the cable. The jointed parts, *b*, are then shut down, the nuts pushed off the cables upon the tubes, then screwed up, and the junction is complete.

Fig. 2 is a section showing a somewhat different method of forming such joints. The coupling tube, *a*, is made in two halves, and the conducting wires of the two sections of the cable are brought together and united directly. The nuts, *c c*, are slipped off the tube over the ends of the cable, the tube opened, the sections brought together, united, the interstices filled with plastic gutta percha, the tube closed around the cables, the nuts passed back over their ends, screwed up, and the coupling is completed.

In Fig. 1 the inside of the tube is grooved to receive the special covering of the cable, and hold it fast like a screw bolt in a nut; but in Fig. 2 the covering wires of the cable are turned back over a metal ring and the form of the tube corresponds to this, so that the cable is locked firm in the tube, and cannot be drawn out of place. A quick and strong method of jointing the sections of marine cables is absolutely necessary in cases of emergency which often occur at sea.

At a recent meeting of the Transatlantic Telegraph Company, held in London, the capital was increased to meet additional expenses especially for seven hundred miles of extra cable to be provided for the next attempt. This enterprise meets with the sympathy and good wishes of all men, because, if successful, it will be of world-wide benefit; but we are fearful, from the difficulty of working lines not one-fourth the length of the Atlantic cable, that communication through it is more than doubtful, even if the cable should be laid successfully. The steam frigate *Niagara* has been completely repaired, and is now on her second voyage to England, to engage in laying the cable in conjunction with the frigates provided from the British fleet. The next attempt to lay the cable will take place, it is presumed, in the early part of May, when we hope all will result well in the issue.

The Great Myth.—We are glad to announce that the mighty humbug which has so often made us gape with wonder is at last caught. A gentleman of Newcastle-on-Tyne, England, informs the London *Times* that he caught the sea-serpent some time ago in lat. 26 S., lon. 6 E., and it proved to be nothing but a gigantic sea-weed, the root of which formed the head, and the leaves the flowing mane so often described.

Gas Meters.

We have received a communication from John Watson, of Louisville, Ky., in reference to the article on page 186, referring to the charge of R. Prince, of Brooklyn, N. Y., against gas companies employing meters constructed to register a greater amount of gas than that consumed by customers. Our correspondent states that there are over 3,000 gas meters in use in Louisville, made by different manufacturers in Philadelphia, New York, and in London, England; that they are all carefully tested before they are used; that they register correctly; and that gas consumers are not deceived by them. The gas works in Louisville have apparatuses for testing the quality of the gas and the correctness of the meters, and these are at the service of customers at all times. He states that a public inspector may do very well in large cities, but the expense of such an office would be too great for small towns and villages. He is undoubtedly correct in this opinion.

A bill has been brought into the Legislature of New York to appoint a public inspector of gas meters for this city; and perhaps it will become a law, thus creating a new office, which would be very satisfactory to the public if proper persons could be appointed for the purpose. But in a city like this, where appointments are made on political grounds, without regard to the fitness of the appointees, we question if a Board of Inspectors would be of much benefit to the gas consumer.

One thing, however, the gas companies should be compelled to do, and that is, to permit every householder to *own* the meter, if he should wish to purchase it, subject to the control of the company, or else to reduce the rent of meters to a reasonable charge. At the present rent charged by our companies for meters, they must realize at least 40 per cent per annum on their cost, which is at least 30 per cent too much.

Mr. Samuel Down, who manufactures all the meters for the gas companies of New York city and Brooklyn, has called upon us since the above was in type, and contradicts every allegation made by Mr. Prince relative to the incorrectness of the gas meters made by him; and he states that he has supplied, in various sizes of meters from his manufactory, during the past ten years, the enormous number of 80,000 meters! He also states that it will give him pleasure to see any consumer of gas at his factory at 22d street, near 10th Ave., New York, and to prove any gas meter made by him and in use, and invites all such to call. It will give him pleasure to see any scientific gentlemen who may feel an interest in the question, and to have them examine and test, to their own satisfaction, the accuracy of the instruments used in proving the gas meters. The process is very simple, and easily explained and understood; and if those who have doubts on the subject will call, he will cheerfully give them such evidence as will satisfy them that there is no article of commerce more accurately measured than the gas which is habitually dealt out to them by the companies so unjustly abused.

Dr. Livingstone's New African Expedition.

It has been announced, that the vessel which has recently sailed with the now celebrated Dr. Livingstone for the southeast coast of Africa, has on board a peculiar steamboat, provided by the British Government, to enable the veteran traveler to prosecute his investigation of the Zambesi River. This small steamer or launch, has been built at Birkenhead, opposite Liverpool, by John Laird, and the material of which it is principally constructed is the "homogeneous metal," noticed on page 149, this volume Scientific American. The plates for the hull of this steamer will be as strong as those of common iron double the thickness. For convenience of transport, it has been built in three sections. The center section contains the boiler and a single horizontal high-pressure engine of 12-horse power, and the two end sections are fitted up for the accomodation of the persons engaged in the expedition. Each compartment is made secure with water-tight bulkheads. In the aft section is a neat deck-house, which will be comfortably furnished, and will have every necessary appliance for securing ventilation. The vessel is a paddle steamer, her dimensions being—length, 75 feet; breadth, 8 feet; and depth, 3 feet. She will not draw more than 12 or 14 inches, so that she is expected to be able to navigate the shallowest parts of the river. The boiler, as well as the hull of the launch, is made of the homogeneous metal plates, which are only three-tenths of an inch thick. The sections will be joined together and launched when the ship reaches her destination. Great results are expected from this expedition.

Explosion of an Air Chest.

We have received from one of our correspondents—S. M. Parsons, of Waukau, Wis.—the account of a peculiar explosion of an air chest which took place a few weeks ago at the Vermilion Blast Furnace of that place. Dr. Tilden, one of the proprietors, informed him that the furnace and hearth were of the common form with one tweer, using charcoal for fuel with hot blast smelting a mixture of bog and other iron ore. The furnace had run over thirty days, and was stopped half an hour to draw off the metal. The instant it was started again, the air chest exploded with a most violent report, and doing considerable damage. It was situated one hundred feet from the furnace between two cylinder bellows, with which it was connected by swing valves. The pipe connecting it with the furnace passed back and forth under the boilers where it leaked a little air, and the tweer also leaked some water at its mouth.

Various cases of explosions are on record as having been caused by leaky tweers, and in all likelihood this was the cause of this explosion. Water falling upon red-hot charcoal, or iron will be decomposed, and the hydrogen gas set free. In this case, water from the tweer may have been decomposed, and the hydrogen may have passed into the leaky air-pipe, thence into the air chest, and mixed with the oxygen of the air, thus forming a violently explosive compound gas easily ignited by the most minute spark.

Business Prospects.

We are happy to chronicle a gradual and healthy resumption of business. We learn from an exchange that all the large iron manufacturing establishments at Troy, N. Y., have resumed operations. The Burden Troy Iron and Nail Factory, Rensselaer Iron Works, and the Albany Iron Works are in full operation, but at a reduced rate of wages. Wm. Mason & Co.'s Locomotive Works, Taunton, Mass., also Rogers' Locomotive Works, Paterson, N. J., are beginning to feel the effects of the favoring gale.

Death of Commodore Perry.

This distinguished naval officer died at his residence, in New York, on the 4th inst., in the 64th year of his age. He entered the service in 1809, and was best known in the scientific world as having commanded the famous expedition to Japan, which extended from 1852 to 1855. The immediate cause of his decease was chronic rheumatism, from which he had been suffering for about ten days.

Death of an Editor.

Freeman Hunt, the publisher and editor of the *Merchants' Magazine*, died on the 3d inst., at his residence in Brooklyn, N. Y. In early days he was a practical printer, and during his lifetime was the editor of several works, but was chiefly distinguished as the founder and conductor of the above able periodical.

Apology. — The Scientific American was printed last week on an inferior quality of paper, which we regret very much. We will endeavor to keep a sharp look out in future, so as not to impose upon its numerous readers again in like manner.

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Proposed Changes in Patent Laws.

MESSRS. EDITORS;—I have been reading your comments upon Messrs. Taylor & Chaffee's Patent bill and I most heartily concur in all your views. It would be a gross outrage upon inventors to pass such a bill. Would it not be well for you to suggest in your paper that all inventors should write to members of Congress from their districts, to oppose the bill? I have already written to ours.

G. W. HILDRETH.

Lockport, N. Y., February 2, 1858.

[Capt. R. B. Forbes, of Boston, a veteran in scientific and mechanical subjects, writes: "I have read carefully your remarks on the proposed changes in the patent law, and I hope the subject will continue to be discussed, for it is apparent to me that great injustice will be done if this law goes into effect."

There are a great many intelligent men who view this attempt of Messrs. Taylor & Chaffee, to modify the Patent system as a complicated abortion—in fact, we have not heard a solitary approval of it.

The suggestion of Mr. Hildreth, that inventors should write to members of Congress from their district, to oppose not only this but some other notorious schemes, is a good one. Hitherto this class of our citizens have remained in the back ground in this particular, and it is well for them to indulge a little in the benefits of the franking privilege which members of Congress enjoy, and enter solemn protests against such evil attempts at legislation.

A patent bill has been presented to the Senate by Mr. Evans, of South Carolina, which we feel assured will meet the concurrence of inventors generally. We are advised that it proposes simple reforms, such as are really needed to render our Patent system a model of simplicity and wisdom.

The Cold Deep Sea.

MESSRS. EDITORS—I noticed on page 150, this volume of the SCIENTIFIC AMERICAN, an article under the head of "Earth and Ocean Temperatures," in which it is stated that Lieut. Berryman, U. S. N., in his deep sea soundings, 500 miles north of Bermuda, found the greatest reliable depth ever obtained, and accompanying this, "thermometrical observations of a character indicating phenomena never before discovered, and which, at this moment, are an unsolved problem to the scientific world. In a long series of experiments, the temperature was indicated as existing ten, fifteen, and twenty degrees below the freezing point. This may be owing to the defective instruments, but if so, a consistency of error was preserved almost beyond the possibility of chance."

I make no pretentions whatever to scientific attainments, but I wish to give two or three facts, in my own experience as a practical man, that may help to elucidate, or throw one light upon this "unsolved problem."

I have been engaged for over twenty years in the curing of provisions, more particularly and extensively hams; and first, I have observed that in very cold winters, such as the last (1856-7), the temperature of the pickle in which the hams were immersed would fall to ten, fifteen, and twenty degrees below the freezing-point. The hams at the same time would be perfectly solid, and that, too, after being salted down in mild weather, for three or four weeks perhaps, before the commencement of the severely cold weather.

Secondly: My establishment is on the banks of the Ohio river; the lower story is subject to be overflowed or submerged in our greatest floods in the winter or spring. On one occasion of a flood we had several open tubs of pickle on the lower floor, which we found impossible to move before the water came upon us. The river rose at least eight feet above the tops of the tubs of pickle. We supposed that the pickle—from the motion and agitation of the waves and water—would all be destroyed, and the tubs displaced. But we were surprised to find the tubs in their places and the pickle uninjured, and in full strength, after being thus submerged for eight days.

These facts demonstrate two things: first, that pickle will not freeze or become solid at 20° below the freezing point; and second, that its specific gravity and density is such that it will not mingle with water without a considerable degree of agitation. I would, therefore, suggest the query to Lieut. Berryman, whether or not the peculiar thermometrical phenomena he discovered in the deep sea soundings were not owing to the increased density and saltness of the water at the bottom of the ocean. C. DUFFIELD.

Louisville, Ky., March, 1858.

[The deep sea soundings of Lieut. Berryman have done much to confirm a theory found in Lieut. Maury's works, as to the cause, or one of the causes, of the Gulf stream. Thus, for example, it is ascertained that, at a depth of two thousand feet, in the straits of Florida, the temperature of the ocean is several degrees above freezing, while in the deep soundings on the telegraph route it is found the temperature is ten to fifteen degrees below the freezing point. Hence, according to well-known laws, the warm and light waters of the Gulf flow off toward the colder regions of the north. At the same time, the denser waters of the northern Atlantic make their way southward to restore the equilibrium. Thus, there are two currents, an upper and an under, flowing in contrary directions. The upper is the Gulf stream; the under is frequently demonstrated by the fact of immense icebergs, reaching down thousands of feet below the surface of the ocean, and seen floating southward *against* the surface current.—EDS.

Puddling and Boiling Iron.

MESSRS. EDITORS:—For some years I have been struck with the amount of metal which is actually wasted and lost in the above processes. In puddling, there is what is called drying the iron, and then it must be melted or refined to make plate metal; during these processes from 15 to 20 per cent is lost. In boiling iron, pig metal is used without refining, and it wastes from 5 to 8 or even 10 per cent., it also requires 100 pounds of scrap iron burnt to nothing, and 200 pounds of Champlain ore to keep the furnace in order, daily.

Some time ago I discovered a method of refining iron without melting it: that is, I can render it fit to be puddled by drying only, or make it equal to plate metal, and save the 15 or 20 per cent usually lost, and dispense with all scraps and ore. Is that patentable? and how can I be safe until I prove it?

OPERATOR.

Birmingham, Pa., Feb. 19th, 1858.

[Much has been done in the treatment of iron in a molten state to refine the product, and it depends entirely upon whether you have invented a new method of treatment, as to its patentability. You might lodge a description of you invention with some friend, if you do not feel like filing a caveat. You will be as well protected in one act as the other. EDS.

Stalactites.

It sometimes happens that minerals occur in the form of conical masses, resembling icicles, which in many instances have a hole running through their center. Carbonate of lime offers the most numerous examples of this kind of formation, which is commonly occasioned by the dropping of water from the roof of a cavern. In this case, the water surcharged with carbonic acid holds the carbonate of lime in solution, and when that escapes, the mineral is deposited in the solid form. The cones thus depending from the roof have received the name of *stalactites*, and are, in most instances, placed immediately over similar formations on the floor, called *stalagmites*, by the union of which with the stalactites above, complete pillars, from the floor to the roof, are occasionally produced. Chalcedony and brown iron ore also occur in the form of stalactites.

Circular Saw Mills—Patent Decision.

"The case of Page *vs.* Terry, to which we referred in our last issue, is one of more than ordinary interest, as it involves the exclusive control of the circular saw mills used for sawing lumber from ordinary saw logs throughout the United States."—Detroit paper.

There has been another suit tried since the above, (Page *vs.* Westervelt), in which the same points were at issue, and both resulted in favor of the plaintiff. Both were tried at Detroit, before Ross Wilkins, Justice of the Supreme Court of the United States.

The plaintiff claims that all circular saws used for that purpose, which have guides near the edge in combination with end-play to the shaft, are controlled by his patent, and that no one has any right to use them without a license from him.

The defence was put on the grounds:—

First, That from the drawings and specifications in the plaintiff's patent, the mill could not be constructed.

Second, That the patent was useless, as better lumber could be made without the plaintiff's improvements.

Third, That there had been no infringement by defendant.

The trial lasted a fortnight, and was closely litigated at every point.

The verdict was in favor of the plaintiff on all the issues, thereby giving him the complete control of that class of mills. There are many thousands of them in operation, and the demand for them is daily increasing. The charge of the Court was in favor of the plaintiff on nearly every legal question which arose in the case, and was substantially the same as that given by Judge McLean on the first trial.—*Angelica (N. Y.) Recorder.*

[The foregoing extracts were sent to us a few weeks since for publication; but from their tone we deemed them partial, and from the language used, we knew they were incorrect, and we therefore would not publish them. Since that period they have come to us again, accompanied with the following note of Judge Wilkins:—

H. B. NORTHROP, ESQ.—Dear Sir: The charge of the Court in the above case was substantially the same, on the *main* points involved, as that of Judge McLean in Page *vs.* Terry. There were other questions, collateral and incidental, most of which were decided in favor of defendant. The verdict was for plaintiff on the facts of utility, infringement, and the sufficiency of the specifications and drawings. The construction of the patent was with the plaintiff. ROSS WILKINS,

United States District Judge.

Detroit, Feb. 25, 1858.

This note of Judge Wilkins contradicts the language employed, as quoted from the "Detroit paper," which conveys the idea plainly that the case involved the exclusive control of all circular saw mills for sawing lumber from ordinary saw logs throughout the United States.

The decision referred to Page's improvements exclusively; and his patent, granted July 16, 1841, sets forth what those improvements are, in the following claim:—

"I claim the manner of affixing and guiding the circular saw by allowing end-play to its shaft, in combination with the means of guiding it by friction rollers embracing it near to its periphery, so as to leave its center entirely unchecked laterally." There is also a disclaimer as follows: "I do not claim the use of friction rollers embracing and guiding the edge of the circular saw, these having been previously used for that purpose, but I *limit* my claim to their use *in combination* with a saw having free lateral play at the center."

The method of applying the friction rollers, by attaching them to pivots, is also claimed; likewise the forming of a long carriage by uniting two short sections by means of a rack—thus rendering the mill portable; but we have quoted all that is necessary from the claims which have a bearing on the above case. A patent was granted for circular saw mills as early as 1795, to Z. Cox, of Georgia; and in August, 1834, Thomas Blanchard obtained a patent on improved circular saw mills for sawing lumber from logs. Mr. Page's patent is undoubtedly a very important one, but it does not by any means cover circular saw mills in the broad sense of the term. This patent was extended for seven years from July 16th, 1855.

Challenge to Inventors of Breech-Loading Guns.

Lieut. John C. Symmes, of the U. S. Ordnance, Watertown Arsenal, Mass., and inventor of a breech-loading rifle, challenges all inventors of breech-loading guns in any service of any country in the world, and the Sharp's Arms Co., and Colt particularly, to come forward and test the relative accuracy of their guns against his, during the month of May next, at the above place. The stakes to be from $100 to $500 a side. His money is posted with Messrs. Haven & Co., No. 7 Beaver street, New York. If no answer is made to this challenge before the 8th of April he will consider that his is the best gun. Inventors who accept the challenge will write to the Lieutenant, as above, for particulars.

Glaciers.

These are accumulations of ice and hardened snow, occurring in the valleys and on the slopes of the Alps, and other lofty mountains. Saussure distinguishes two kinds of glaciers, viz., those contained in the valleys more or less deep, and which, though at great elevations, are yet commanded on all sides by mountains higher still; and those not contained in the valleys, but spread out on the slopes of the higher peaks.

Momentum.

This term is used in mechanics to signify the force of percussion, or the intensity of a moving body, and this is always equal to the quantity of matter multiplied into the velocity. Thus, a ball of four pounds weight moving at the rate of eighteen feet in a second, has double the momentum of a ball weighing three pounds, moving at the rate of twelve feet in a second, for 4×18 is double 3×12.

Anilic Acid.

This is called also indigotic acid, from being produced by the action of diluted nitric acid upon indigo. Carbonic acid is produced with it, and remains in solution, the anilic acid separating it in light yellowish-white prisms, which are fusible and volatile, and dissolve in 1,000 parts of water. Anilic acid decomposes acetate of lead, forming with the lead a crystallized anilate.

The Coming Eclipse.

An eclipse of the sun will occur this year in the month of September; but it will only be central and total to the inhabitants on the southern part of our continent—America—where there are no observatories, we believe. Some of our scientific institutions should take measures to send out some of their *corps*, to make observations in Brazil and Peru.

We are under obligations to Hon. John Cochrane, Hon. W. D. Bishop, and Hon. S. A. Douglas, for congressional documents.

We have also received from Benj. C. Howard, Esq., author of Howard's Reports, a report of the discussions of the Supreme Court of the United States, and the opinions of the Judges thereon in the case of Dred Scott *vs.* Sandford. It is a document of legal and historical interest.

The onion is a superior disinfectant. Two or three good-sized ones, cut in halves, and placed on a plate on the floor, absorb the noxious effluvia, &c., which are generated in the sick-room, in an incredibly short space of time. They should be changed every few (say six) hours.

TO SUBSCRIBERS.—This number commences the second half of Vol. XIII, SCIENTIFIC AMERICAN. Now is the time to send in half-yearly subscriptions.

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Correspondents

S. N., of N. Y.—You should communicate with the Illinois Board of Agriculture in relation to the steam engine for agricultural purposes. We have no personal interest in the matter.

J. T., of N. Y.—The cost of small knitting machines is about $100. Address Geo. Whipple, No. 23 William street, this city, regarding the purchase of them.

E. W., of N. Y.—The constructing of a railroad break in the form of a shoe to be dropped in front of the wheel, for the purpose of taking the wheel from the track and resting the weight of the car upon the shoe, is not new, nor has it proved practicable in operation.

C. T. H., of N. Y.—You cannot prevent the magnetic current influencing a piece of soft iron when passing around it on a proper wire. Why do you ask such a question, when you can in an instant stop the magnetic action by breaking the circuit between the magnet and the battery?

J. B. M., of Me.—When you get your perpetual motion to work, we will get you a patent upon it, pay all the expenses of the application, and allow you to have the entire benefit which may be derived from the invention. We could not lay your matter before Congress, but perhaps the M. C. from your district might favor you.

A. G., of La.—Carbureted hydrogen gas for illumination can be made from wood in the same manner as it is made from coal; but it is not so good in quality as when the retorts are so made that the gas, after it is generated, is directed over a highly heated surface before it goes into the cooler. You can make very good gas from pine wood, however, by simply roasting the wood in a tight iron retort, and passing the gas therefrom through milk of lime and a water cooler, thence into a tight receiver for use. The apparatus is very simple.

T. M., of N. Y., inquires how far a pound of lead will sink dropped into the sea? Ans.—It will sink until it reaches the bottom, and that distance will depend of course upon the depth of the water.

Wm. Cann, formerly of Black Rock, N. Y., is requested to give his present address to John M. Hartnett, of Wauconda, Ill.

J. V. Jenkins, of Detroit, Mich., the inventor of the sheep-shearing machine, illustrated on page 129 of the present volume of the Sci. Am., wishes to correspond with persons who would manufacture the machine or vend territorial rights.

G. T., of ——. Your fire alarm for hotels and houses, consisting of an inflammable cord to be easily consumed by fire to detach the spring, so as to set the alarm bell ringing, is not new. The same kind of an alarm was in operation some years ago in our office.

S. B., of Pa.—Vulcanized india-rubber is very good for packing steam joints, but no oil must come in contact with it. If you use oil in your pipes you must employ gasket and white lead packing. Pasteboard and white lead packing for joints also answer very well.

C. C. S,, of Vt.—A heavy balance wheel placed in a frame upon platform scales will weigh as much while in motion as when at rest, and it will also bear as heavily upon its journal boxes when in motion as when at rest.

E. S. A., of Ill.—On page 357, Vol. 7, Sci. Am., you will find a very complete article on lithography.

H. M., of Conn.—We are unacquainted with any reliable recipe-book relating to two such different arts as mixing paints and making solders. In "Ure's Dictionary of the Arts," you will find considerable information, such as it is, on both subjects.

H. H. P., of N. Y.—It will not affect the legality of your patent to sell machines before the patent is issued.

H. C., of Mass.—We thank you for the names you send us, and will mail copies of our paper to each. We are always pleased when subscribers can so strongly testify to the benefit gained from our paper. We thank you for your high testimonial.

A. T. S., of Iowa.—Write to McAllister & Bro., No. 728 Chestnut street, Philadelphia, regarding "dissolving views" for exhibitions.

J. A. B., of Ill.—Your hoggish system of feeding hogs may be very profitable, but you must possess a stomach of infinite endurance, if you consider it palatable or possible.

J. R., of La.—The Chinese sugar cane is cultivated in the same manner as Indian corn, and alcohol is distilled from its juice or sirup in the same manner and by the same processes as it is distilled from common molasses.

J. R. S., of N. Y.—We have examined your sketch of a hot air engine, and think it will operate, and run with considerable power, if you use plenty of fuel. Ericsson is now building some portable hot air engines for pumping water, at Delameter's works, this city, which are the most manageable and convenient engines for the purpose ever examined. You are mistaken in supposing that you can gain power by contracting the hot air in your engine as described in your letter. There is a gain obtained from expansion, but not contraction.

G. H., of Miss.—Your communication is very interesting, but does not throw any light upon the subject of serpent charming. The suggestions you make on the strength of the anecdote are good, although we think there is a bit of the "hunter" in the story.

M. R. A., of La.—There are engravings of gasworks that would suit you in the present number of our paper, and as to the roofing we have not any opinion for or against it, not being practically acquainted with its qualities.

J. F. B., of Ohio.—"Musical triangles"—those which we suppose, you mean,—are forged out of bar steel into the proper triangular form, and the three legs filed round then polished and tempered like any other piece of steel.

F. D., of N. Y.—We are not acquainted with any substance which could be used as a substitute for a hair brush that cannot be acted upon by sulphuric acid. What do you mean by "sheet links?"

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, March 6, 1858:—

L. P., of Del., $30; A. F. R., of N. Y., $30; C. W. H., of Mass., $25; A. H. G., of Ind., $25; B. C. V., of Ohio, $30; W. H. C., of Ill., $30; F. N., of N. Y., $31; N. H. S., of Ill., $10; J. A. B., of La., $50; O. L. C., of Ill., $25; I. B. J., of Cal., $10; L. R., of Mass., $5; A. E. L., of Pa., $30; J. McN., of L. I., $30; W. & B. D., of Conn., $25; W. B. Jr., of Mass., $20; C. W. & W. W. M., of ——, $20; J. C., of Ohio, $100; J. B., of N. Y., $30; J. L. R., of S. C., $25; O. P. S., of Maine, $25; C. F., of N. J., $30; O. S., of N. Y., $25; C. M. L., of O., $30; J. B. McC., of Ky., $30; F. B., of N. Y., $15; S. D. C., of Wis., $100; M. E., of Ohio, $25; W. Z., of Pa., $25; B. & F., of N. J., $10; B. B. M., of Fla., $30; G. & G., of Pa., $30; J. C. S., of Mass., $35; J. F. E., of Conn., $25; A. & Bro., of Conn., $25; J. H., of N. Y., $25; E. K., of Pa., $25; W. H. M., of Iowa, $30; F. S., of Pa., $25; A. A., of L. I., $25; A. & H., of N. J., $25; T. W., of L. I., $25; J. McI., of N. Y., $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, March 6, 1858:—

A. H. G., of Ind.; C. W. H., of Mass.; J. B. J., of Cal.; A. A., of N. Y.; A. & H., of N. J.; W. & B. D., of Conn.; A. E. L., of Pa.; T. W., of L. I.; G. T., of N. Y.; F. N., of L. I.; I. L. R., of S. C.; J. McI., of N. Y.; R. B., of Ohio; M. E., of Ohio; W. Z., of Pa.; J. F. E., of Conn.; S. & J., of Ky.; J. F. A., of N. Y.; A. & Bro's. of Conn.; F. S.. of Pa.; W. C., of Ind.

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Consultation may be had with the firm, between nine and four o'clock, daily, at their principal office, 128 Fulton street, New York. We have lately established a Branch Agency on the corner of F. and Seventh streets, Washington (opposite the United States Patent Office). This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it.

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Circulars of information concerning the proper course to be pursued in obtaining patents through our Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the principal office or either of the branches.

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The annexed letter from the late Commissioner of Patents we commend to the perusal of all persons interested in obtaining patents:—

Messrs. Munn & Co.—I take pleasure in stating that while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE came through your hands. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill, and fidelity to the interests of your employers.
Yours, very truly, CHAS. MASON.

FOR SALE—THE PATENT RIGHT OF LAMSON'S Combined Tool, an engraving of which appeared in No. 26, Vol. XIII, of the Scientific American. Apply to the patentee, New Worcester, Mass.

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NOTICE IS HEBEBY GIVEN THAT THE copartnership between B. Moore and W. S. Clark, has been dissolved, and by arrangements made, all debts and amounts due to, and payable by, the late firm of Moore & Clark, are to be received and paid by Mr. B. Moore.

The business will be conducted, as heretofore, under the firm of B. MOORE & CO., 133 High Holborn, London, Merchants and Manufacturers of British and American machines, and negotiators for the sale of patents and patent rights.

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ANOTHER WONDER—BALDWIN'S TURbine Water Wheel (represented in No. 51, Volume XII, Sci. Am.,) gives from 75 to 97 per cent of power, according to the size of wheel and head employed. Usual sizes, with 4 to 25 feet fall, give 80 to 90 per cent. For information address S. K. BALDWIN, Laconia, N. H.

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ALCOTT'S CONCENTRIC LATHE—THIS Lathe is capable of turning under 2 inches in diameter with only the trouble of changing the dies and patterns to the size wanted. It will turn smooth over swells or depressions of ¾ to the inch, and works as smoothly as on a straight line, and does excellent work. Price $25, (without frames,) boxed, and shipped with directions for setting up. For sale by MUNN & CO., 128 Fulton street, New York City.

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NOTICE.—ALL PERSONS ARE HEREBY warned not to purchase of F. V. Vannest, or any other traveling agent, rights of R. E. Schroeder's patent for improved Lime Kilns, as no agents have been employed for more than a year to dispose of said rights. My patent is the first and original one for perpetual draw kilns; it is used by hundreds of the most experienced lime-manufacturers, and pronounced by them far superior to any ever in existence. Persons purposing to purchase territory will please address RICHARD E. SCHROEDER, Rochester, N. Y.

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JOHN H. LIDGERWOOD & CO.,
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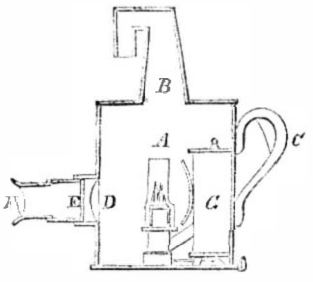
Who has not heard of all the wonders of the magic lantern?—how little figures painted upon glass become magnified into big comic men and women when seen upon the screen. It is not only a very amusing toy, but a very philosophical instrument, and we dare say that the inventor, Kircher, who was a celebrated mathematician and philosopher in the seventeenth century, little thought that children would be amused with it, because he intended it to be an object of study for the monks in their cells. This Kircher was an extraordinary man, he knew a great deal more than was common among his fellow monks, and he has since been called a man of "immense but undigested learning;" because he made the most extraordinary and random statements upon the deepest questions of philosophy. In one city of Europe, Nuremberg, many thousands of cheap magic lanterns are made every year, and they afford winter evenings' enjoyment to the children of the whole civilized world.

We will now describe the construction of this instrument, having reference to the engraving, which is a section of a magic lantern. A is a box of wood or metal having a chimney, B, and a handle, C. In a round hole in the front is placed a piece of glass called a lens, of convex form, that is, its back is flat and its front side is rounded from the center to the edges, as seen at D; this is called the condenser, because it collects or condenses the rays of light from the lamp, G, which is placed inside the lantern, A. Beyond D is a sliding tube, having at its extremity a lens, F, which is double convex, or rounded at both



its sides, in short, a magnifying glass. In a slit in this tube, the glass slide, E, having the figure, a picture, painted on it, is inserted upside down, and a white sheet being stretched across one end of a room, and all the lights, save the lantern, turned out, the exhibition is ready to commence. "Ah! but," says some young inquisitive who has seen the magic lantern's wonders, "how is it that you see the funny things so large upon the sheet when they are so little on the slide?" We will tell you. The light from the lamp has no escape except through the condenser, which throws a strong light upon and through the colors on the slide, and these colored rays, being confined by the tube, are passed through F, which spreads them out and so makes them meet each other at what is called the focus of the lens (of which we shall have more to say next week), and throws them very large upon the sheet, and there being no other light in the room, they become visible right side up, because the rays have been turned round or reversed by the lens, and it depends upon the distance of the lantern from the sheet whether the figures are large or small.

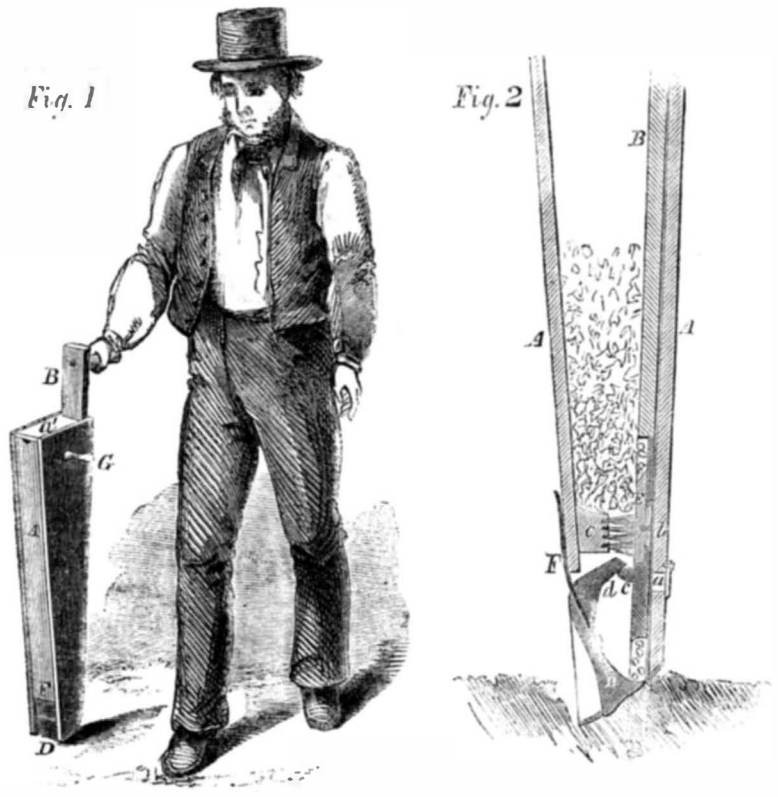
Improved Corn Planter.

Hand corn planters have now almost taken whole possession of some sections of the country, although a few years ago they were unheard of, and we have no doubt that many farmers will find occasions and places on their farms when and where the hand-planter will be the most advantageous. Among the many hand corn planters that have been invented and patented, none seems to us to fulfil more completely the functions desired than the one here described.

In our engravings we have represented one of these, seen in perspective and as used in Fig. 1, and in section at Fig. 2. A is a seed box having a door or lid, *a'*, at its top, and a planter or movable slide, B, provided with a handle whereby it can be operated, passing through it. Inside the box, A, a brush, C, is fixed, and to the sides of A a shoe of cast iron, D, is hinged, being also connected with the spring, F, which has the tendency to force it back, making at the same time a clicking noise, thus indicating that the seed has been planted. The planter or slide, B, is shod with iron, and has in it a groove which carries the seed from the box downwards. This groove can be made to hold a greater or less number of seeds as desired, by the slide, E, and screw, *b*, which can be adjusted through the little hole at the back of the planter, *a*.

The operation is very simple. The operator grasps the handle at B, behind which there is a gage to regulate the depth at which the seed is to be buried, and pushing the box into the ground, a certain number of seeds are carried by B past the brush, which sweeps off the excess into the lower space. Another step is taken, the planter again pressed in the ground; but this time as B is being pushed down, the little projection, *c*, releases its hold on *d*, which F pulls away and allows the seed to fall into the ground, the iron shoe of B following them and pressing them the required depth; when B is lifted, the projection, *c*, catches *d*, and forcibly causes D to come back and presses the soil upon the seed.

BOEKLEN & BOSSERT'S CORN PLANTER.



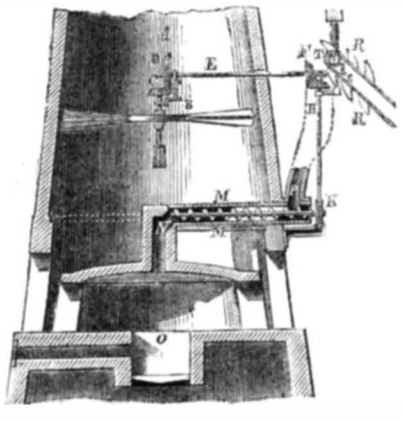
G is an extra handle that can be used should the ground be a little hard, to give the operator more power to force in the planter.

The advantages of this method of planting seeds are obvious, as the seeds being all buried at an equal depth, and each covered with the same amount of soil at the same pressure—that is, that the ground is made equally tight around each seed—the probabilities are that the crop will be more uniform than when there is an irregularity in the planting.

Further information can be obtained by addressing Boeklen & Bossert, No. 57 Essex street, Jersey City, N. J. A patent was secured by R. Boeklen, Feb. 10, 1857.

Wright's Apparatus for Feeding Furnaces.

This figure is a vertical section of a self-acting apparatus for feeding furnaces with fuel, secured by patent in England as the invention of W. Wright, of Newcastle-upon-Tyne, and described in the London *Engineer*. It is intended to supply fuel regularly to the fire, is especially designed for glass furnaces, and is operated by the draft of the furnace



itself. A is the cone of the glass stack or house; it is furnished with a screw fan-wheel, B, set in the wall, and revolving horizontally in the stack. The bevel gear, C D, operated by the fan, gives motion to the shaft, E, on which are gears, F G, that give motion to the vertical shaft, H, the lower end of which has a worm wheel on it that meshes into another, K, on the outer end of the archimedean screw shaft, M, working in a round casing, the inner end of which opens into the passage, N, leading to the furnace, O.

The fuel is carried up by an elevator, R R, which is also operated by the shaft, E, through a worm gear, S, on its outer end meshing into a worm, T. The fuel is deposited by the buckets of the elevator into the receptacle, H, thence passes down the channel, P, into the case of M, and is conveyed forward to the furnace passage, N, by an archimedian screw. As the fan wheel, B, is operated by the draft of the furnace, it follows that after it has started, it will supply fuel when properly set for the purpose in quantities proportioned to the combustion, thus forming a constant supply. As there are quite a number of glassworks in our country, this is a subject for the consideration of those engaged in the glass business. The apparatus is also applicable to other kinds of furnaces.

WHILE boring an artesian well at Lafayette, Ind., very recently, after penetrating to the depth of 216 feet, a subterranean stream was reached, which, in an incredible short time, filled the well to the top. The *Courier* says that "Arabs in the desert could not have been more delighted" than were the citizens of that city. This experiment of an artesian well was made at the expense of the county.

Literary Notices.

NEW AMERICAN CYCLOPÆDIA, VOL. I. D. Appleton & Co., New York. The value of a really good cyclopædia is inestimable, because it is the collection and condensation of the facts contained in many libraries, without the dressing and adornment with which the original authors thought proper to clothe them. A learned divine was once asked by a rich man, what was the use of a library containing so many books? "for," continued the man of money, "you can never read them through." "Let me," said the divine, in reply, "let me ask you, what is the use of your dictionary? you never read it through." "Oh! the dictionary is of great use." "Then sir," replied the other, "what the dictionary is to you, my library is to me—a place of reference." This is exactly the case of cyclopædic literature; one does not expect ever to read a volume through, but it is necessary that almost every person should have a copy on their shelves. Concerning the cyclopædia we are now noticing, we have to remark that the first volume—the only one published—is as near perfection as may be: and what is best of all in our opinion, it contains an index to itself—a thing that has long been wanted. It promises to be bulky, but as it is being issued in parts, there can be no inconvenience in that, because the price places it within the reach of every one, and we should advise every one to take it, for we have no doubt that it will long remain a standard, and prove a lasting honor to George Ripley and Charles A. Dana, the painstaking, accurate and talented editors. We shall take occasion to give a more critical examination of this work as we receive the subsequent volumes.

THE LONDON QUARTERLY REVIEW, January, 1858. Leonard Scott & Co., New York. This number has a fine article on "The Difficulties of Railway Engineering," another on "Tobias Smollett," and an excellent description of Woolwich Arsenal, together with many others of equal merit and utility.

HOUSEHOLD WORDS, conducted by Charles Dickens, for March. Jansen & Co., New York. In this spirited, interesting and entertaining British periodical there are so many articles that deserve especial notice that we are afraid to venture on the task. We may, however, say that in the one entitled, "A Deep Design upon Society," the master hand of the conductor is plainly visible.

AMERICAN FARMERS' MAGAZINE for March. J. A. Nash, editor and proprietor, 7 Beekman street, New York. This is a most valuable publication and should be in the hands of every farmer in the country, as it gives them all the information that they require on subjects which possess interest and value to their business and labor.

AMERICAN DRUGGISTS' CIRCULAR AND CHEMICAL GAZETTE. H. Bridgeman, Beekman street, New York. This is a journal which contains information not only for the druggist, but everybody who has any desire to be taught and to hear of the discoveries and inventions which are taking place in the chemical and medical world.

EDINBURGH REVIEW. This able Review, for this quarter, published by Leonard Scott & Co., No. 54 Gold street, this city, contains nine sterling essays. The leader is on the "Prospects of the Indian Empire," and is a subject of intense interest at the present moment. The author of it appears to be well acquainted with the subject and to have access to the views of the British Ministry.

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